THE

MADRAS JOURNAL

OF

LITERATURE AND SCIENCE,

PUBLISHED UNDER THE AUSPICES

OF THE

MADRAS LITERARY SOCIETY

AND

AUXILIARY OF THE ROYAL ASIATIC SOCIETY.

VOL. XI.

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ROBERT COLE, Esq.

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These 3 plates should have accompanied the last number of the Journal, but could not be executed in time. The Editor regrets extremely that the Map cannot be coloured as in the original, as, after the impressions were struck off, it was discovered that the paper was not of a quality to receive colours. The Map will serve then, only as indicating the general position of the places described in Dr. Malcolmson's Memoir, and will not mark the geological formations.

R. C.

CONTENTS.

Page.

ART. I.—Catalogue of the Birds of the Peninsula of India, arranged according to the modern system of Classification; with brief Notes on their Habits and Geographical distribution, and description of new, doubtful and imperfectly described Species (*Continued*).—By T. C. JERDON, Assistant Surgeon, 2d Madras Light Cavalry...................... 1

II.—Description of a new Species of Naga, or Cobra de Capello.—By WALTER ELLIOT, ESQ........................... 39

III.—A cursory Notice of the Gold Tract in the Kupputgode range—Manganese Mines near Wodoorti—and Flint excavations in the Southern Mahratta Country—the Corundum Pits of the western part of Mysore, and the Diamond Mines of Kurnool.—By Lieut. T. J. NEWBOLD, 23d Light Infantry.. 42

IV.—Journey of the Russian Mission from Orenbourg to Bokhara.—Translated by Colonel MONTEITH, K. L. S., Chief Engineer of the Madras Army (*Continued from vol.* 10 *p.* 168.).. 52

V.—On the advancement of Geological Science in India.—By Captain J. CAMPBELL, Assistant Surveyor General.......... 78

VI.—Sixth Report of progress made in the Examination of the Mackenzie MSS., with an Abstract Account of the Works examined (*Continued*).—By the Rev. WILLIAM TAYLOR.... 86

VII.—Notes, principally Geological, on Southern India; from the banks of the Tumbuddra to those of the Cauvery.—By Lieut. NEWBOLD, 23d L. I.............. 126

Page.

VIII.—Essay on the Creed, Customs and Literature of the Jangams.—By C. P. Brown, Esq. 143

IX.—On the Cultivation of Cotton in India.—By J. M. Heath, Esq. 178

X.—On Indian Iron and Steel; in a Letter addressed to the Secretary to the Royal Asiatic Society of Great Britain and Ireland.—By J. M. Heath, Esq. 184

XI.—Proceedings of the Madras Literary Society and Auxiliary of the Royal Asiatic Society. 192

XII.—Note by the Editor 200

XIII.—Hourly Meteorological Observations made at the Honourable Company's Observatory on the 21st of December 1839 201

Meteorological Register kept at the Madras Observatory; for the months of October, November and December 1839 202

CONTENTS.

Page.

ART. I.—Catalogue of the Birds of the Peninsula of India, arranged according to the modern system of Classification; with brief Notes on their Habits and Geographical Distribution, and description of new, doubtful and imperfectly described Species *(Continued)*. With two coloured Figures.—By T. C. JERDON, Assistant Surgeon, 2d Madras Light Cavalry.. 207

II.—Account of a Carboniferous Stratum at Baypoor near Calicut, Malabar Coast.—By Lieut. T. J. NEWBOLD, 23d Light Infantry.. 239

III.—Note on the Geological position of the Laterite in the vicinity of Beder.—By the same........................... 244

IV.—Geological Desiderata.—By the same..................... 245

V.—A Brief Sketch of the Life and Writings of Father C. J. BESCHI or VIRAMAMUNI, translated from the original Tamil. With a Protrait.—By A. MUTTUSAMI PILLEI, Manager of the College of Fort St. George and Moonshee to the Tamil translator to Government.......................... 250

VI.—Note on an Ancient Hindu Grant.—By WALTER ELLIOT, Esq.. 302

VII.—Note on the Defaced state in which the Statues of the Jains are now generally found, as connected with the persecutions and overthrow of that People.—By Lieut. T. J. NEWBOLD.. 306

VIII.—On an error in Dr. THOMSON's Mineralogy.—By Captain J. CAMPBELL, Assistant Surveyor General.................. 310

Page.

IX.—On preserving Timber, &c. from the destructive attacks of the White Ant.—By Aliquis...... 313

X.—Notes illustrative of the Geology of Southern India.—By Lieut. R. BAIRD SMITH, Bengal Engineers..... 315

XI.—Geological Features of the Himalayan Mountains........ 323

XII.—The Meteorology of the Plains and Mountains of N. W. India.................. 343

XIII.—Report of the Coal Committee..................................... 355

XIV.—NOTICES OF BOOKS.

1.—Illustrations of Indian Botany, &c.—By ROBERT WIGHT, M. D., F. L. S., &c.

2.—Icones Plantarum Indiæ Orientalis, or Figures of Indian Plants.—By ROBERT WIGHT, M. D., F. L. S., &c.

3.—Illustrations of the Botany and other Branches of the Natural History of the Himalayan Mountains, and of the Flora of Cashmere.—By J. FORBES ROYLE, M. D., V. P. R. S., Late of the Medical Staff of the Bengal Army, &c. &c. &c... 386

XV.—Proceedings of the Madras Literary Society and Auxiliary of the Royal Asiatic Society 387

Note by WALTER ELLIOT, Esq. on the species of Naja described in the last Number of this Journal 390

XVI.—Meteorology

Account of the progress of the Electric fluid which struck the house belonging to Colonel MONTEITH, situated on the Hill at Palaveram, on the 1st November, 1839. With a lithographed illustration.—By T. G. TAYLOR, Esq. H. E. I. C. Astronomer 393

Horary Meteorological Observations made agreeably with the suggestions of SIR JOHN HERSCHEL................ 395

Meteorological Register kept at the Madras Observatory; for the month of January, February and March 1840.......... 398

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No. 26—*January* 1840.

I.—*Catalogue of the Birds of the Peninsula of India, arranged according to the modern system of Classification; with brief Notes on their Habits and Geographical distribution, and description of new, doubtful and imperfectly described Species.—By* T. C. Jerdon, *Assistant Surgeon, 2d Madras Light Cavalry.*

(*Continued from No.* 25 *page* 269.)

Sub Family SYLVIANÆ.—*Small Warblers.*

Genus ORTHOTOMUS, Horsf.—*Tailor Bird.*

114.—*O. Bennettii*, Sykes.—*O. Sphenurus*, Swains. ?—*S. ruficapilla*, Hutton, J. A. S. of Bengal, No. 22.—*S. longicauda*, Vieill. Encycl. Method. p. 456.—*S. Guzuratta*, Lath. Young bird ?—*Phootkee*, H.—*True Tailor bird.*

The long celebrated, and notorious *Tailor Bird*, about which so much was said, and, till lately, so little known, appears to have been first described accurately as such by Lieut. Hutton, in the work referred to, and his specific name should, strictly speaking, be affixed to it, but as his description has probably not been so numerously circulated as that given by Colonel Sykes, with the correct modern generic name also, it would perhaps, be more injurious than otherwise to attempt to restore its legal name, and, moreover, if priority alone was to be consulted, the name applied by Vieillot has the preference. The *S. Sutoria* of

Latham is most probably a fictitious species, and the *Tailor Bird* described and figured by Forbes in his Oriental Memoirs, appears to be a *Cinnyris* (*C. purparata*), which builds a somewhat similarly constructed nest.

The *Tailor Bird* is tolerably common in most wooded districts, and universally spread, frequenting cultivated ground, especially gardens, groves of trees, and also found in high jungle, in the more open spaces. It lives in pairs or in small flocks, incessantly hopping about the branches of trees and shrubs, peas and other vegetables, with a loud reiterated note, and picking various insects (chiefly ants and small larvæ) off the bark and leaves, and not unfrequently seeking them on the ground. It has the habit of frequently jerking up its tail while feeding or hopping about, and at times (especially when calling) it has the power of raising the feathers on the lower part of its throat, and displaying on either side a small black stripe. This has been noted by no one except Lieut. Hutton. The *Phootkee* has various notes, one of which sounds like *twee*, *twee*, *twee*, as mentioned by Colonel Sykes, and another which is generally used when alarmed or angry, and sounds like *chick, chick, chick chicky, chick.* It is a familiar bird, and ventures close to houses, but when observed becomes wary.

The *TailorBird's* nest truly merits all the praise and wonder that have been bestowed on it. I have seen several, and can bear testimony to the accuracy of Colonel Sykes' and Lieut. Hutton's accounts of it, as also to the accuracy of the coloured drawing of one which accompanied, a representation of this species in Guerin's 'Magasin de Zoologie.' Colonel S. has, however, on some occasion probably mistaken the nest of some other bird for it, as he says in his account of the nest and eggs,* that the latter are crimson, whereas in two instances, in which they were observed by me, they were white, spotted chiefly at the larger end with reddish brown, as described by Lieut. Hutton.

Length about 6 inches (to tip of longest tail feather); of wing about 2; tail $1\frac{8}{10}$ths; centre feather of ditto 1 inch more; tarsus $\frac{8}{10}$ths. Irides orange buff; bill brown above, flesh coloured below; legs flesh coloured.

115.—*O. Lingoo*, Sykes.

I have not hitherto procured this bird of which Colonel Sykes says

* Proceedings of Zoological Society for 1834.

" differs from the type of *Orthotomus* in its short tail. Principal food black ants. Length $5\frac{6}{10}$ths; tail $2\frac{1}{10}$th."

Gen. PRINIA, Horsf.—*Pit-pittee*, H.—*Wren Warbler*.

This genus, or sub-genus perhaps, though not admitted by Swainson, I am inclined to adopt in consequence of the well defined group of Indian birds classed under it, which do not exactly correspond with any of Swainson's, though they nearly approach to *Drymoica* (a subgenus of *Malurus*), and probably connect it to *Orthotomus*, with which they are also strongly allied. All the species I have noticed, have similar manners and habits. In this respect they somewhat approach the *Thimaliœ* or *Babblers*, which they perhaps represent in this family, as well in their long, indistinctly barred tail, long legs, short wings, and other structural points, as in their occasionally associating in small flocks, and their incessant calling.

116—*P. socialis*, Sykes.—*Ash-coloured Wren Warbler*.

This species of *Prinia* is unequally distributed over the peninsula, being tolerably common in some localities, and rarely met with in others. In the Carnatic, I have met it among reeds and long grass, by the side of rivers and tanks; on the west coast in similar situations, and much more common; while I have hitherto seen it but rarely in the table land. On the Neilgherries near Coonoor and Kotāgherry, it is very abundant in dry bushy ground.

Colonel Sykes says of this species " has the same ingenious nest, and has the same habits and note, and feeds in the same manner as *O. Bennettii*." I have not verified this observation as to the nidification of this bird, and have found the nest of another species to be very different. Irides orange buff; bill black; legs flesh coloured yellow. Length $5\frac{2}{10}$ths; wing rather more than 2; tail $2\frac{3}{10}$ths; tarsus $\frac{8}{10}$ths.

117.—*P. gracilis*, Franklin.—*Small Wren Warbler*.

This species much resembles the last in colour, but is much smaller, white below, instead of fawn colour, and I have only hitherto found it in wooded places and jungly districts (frequenting trees as well as bushes) in the west coast, and northern part of the table land.

118—*P. inornata*, Sykes.—*Common Wren Warbler.*

This is a very common bird in all parts of the peninsula, frequenting low bushes on the open plains, hedges, low trees, grain-fields, &c. It is found generally in pairs, or sometimes in small flocks, feeds on ants, larvæ and various insects, and endeavours to conceal itself in the thick bushes or hedges, and on being driven away flies off to the nearest bush or tree with the low jerking flight common to others of the genus. I once procured the nest of this species, it was open at the top, neatly enough made with grass, well interwoven, without any lining, and fixed in a low bush, very near the ground: it contained four blue eggs. Irides, brownish yellow; bill, brown above, yellowish below. Length about 5 inches; wing $1\frac{9}{10}$ths; tail $2\frac{3}{10}$ths; tarsus about $\frac{9}{10}$ths.

119.—*P. Macroura*, Frankl. Cat.—*Long tailed Wren Warbler.*

This is a very closely allied species to the last, though perfectly distinct, differing in the more reddish or fawn tint of the brown, and the more rufous tint of the white. It is much more rare than the last, and prefers more jungly and wooded places. Length of one specimen 6 inches; of tail, rather more than 3; wing hardly $1\frac{9}{10}$ths; tarsus $\frac{8}{10}$ths. Irides, brownish orange; bill brown, pale yellow at the base of the lower mandible.

120.—*P. sylvatica.*—New species ?—*Jungle Wren Warbler.*

Descr.—Above olive brown; below and superciliary mark white, tinged with yellowish; tail obsoletely barred, with a larger bar at the tip, and terminated by white, except in the centre feathers; bill strong, black; legs flesh coloured. Irides orange buff. Length 6 inches; wing $2\frac{4}{10}$ths; tail $2\frac{7}{10}$ths; tarsus nearly one inch.

I have only seen this species hitherto in open forest jungle in the Segoor pass of the Neilgherries.

121.—*P. rufifrons.*—New species ?—*Red-fronted Wren Warbler.*

Descr.—Forehead and head rufous; above greenish ash coloured; beneath white; tail brown, and except in the centre feathers, broadly terminated by white, especially the outer feathers. Bill brown, pale below; legs flesh coloured. Irides pale orange buff. Length 5 inches, wing rather more than $2\frac{1}{10}$th; tail $2\frac{2}{10}$ths; tarsus $\frac{8}{10}$ths. I have only

seen this apparently new species in low thick jungle in the neighbourhood of Jaulnah. It associates in small flocks; is very wary, flying before you from bush to bush, with a low chirping note, and so much the manners of a *Thimalia*, that I at first mistook it for one.

122.—*P. cursitans*, Frankl. Cat.—*Ghas ka Phootkee*, or *Ghas ka Pitpittee—Grass warbler—Meadow Wren Warbler.*

This curious lark-plumaged little species of *Prinia* frequents long grass, whether on sides of nullahs, or in the open plains, and is far from being uncommon in most of the large rumnahs of the table land. I have also seen it in the west coast. When disturbed it takes a short interrupted flight, and on seating itself hides among the tufts of grass, and often runs several yards. It feeds on ants, the larvæ of small grasshoppers, and various other insects. This bird if not an aberrant species of Swainson's genus *Praticola*, is probably a link joining it to the *Priniœ*. It differs from the character of *Praticola* in its shorter hind claw, and unnotched bill. Irides brownish yellow; bill brownish above, pale below; legs flesh coloured. Length 4 to $4\frac{1}{4}$ inches; of wing 2; tail nearly 2; tarsus nearly $\frac{8}{10}$ths. I have specimens smaller than this in every respect, killed below the ghauts.

Sub Genus SYLVIA.—*True Warbler.*

123.—*S. Montana*, Horsf.

This species (if truly distinct), which differs from the next only in size, is rare in the peninsula. I possess but one specimen, the locality of which I have mislaid. Length $5\frac{9}{10}$ths; wing $2\frac{4}{10}$ths; tail rather more than 2; tarsus, $\frac{8}{10}$ths; first quill feather very minute and sharp pointed, 2d quill feather longer than the 6th.

124.—*S. Rama*, Sykes.—*Village Warbler.*

This is a tolerably abundant bird in most parts of India, frequenting hedges, gardens and trees, in cultivated ground, and near villages. It is lively and active, hopping about the branches, and capturing various small insects, occasionally on the wing, but generally on the branches or leaves. It has a rather harsh chuckling note which it incessantly

utters on being approached, and endeavours to hide itself, creeping to the farther side of the tree. Some time ago a nest, carelessly put together with twigs and grass, containing 4 pure white eggs, was brought to me as the nest of this species. It was found in a hedge. Irides yellowish brown; bill brown above, yellowish below; feet flesh coloured yellow. Length $4\frac{8}{10}$ths; tail about 2 inches; wing to end of 3d quill $2\frac{4}{10}$ths; Ist a spurious quill feather larger and more rounded than *in the last*, and the 2d is only equal to the 7th.

125.—*S. Trochilus* ?—*Willow Warbler* of Europe.

I possess a single specimen, of what I suppose is this bird, obtained lately in a wooded valley, along the edge of the northern range of ghauts. It appeared active and lively in its habits, occasionally flying from some reeds, and perching on a stone in a brook, and from thence making short sallies after insects in the air, or seizing one on the sand of the rivulet. I shall here add a brief description of my specimen. Above brownish olive; beneath whitish, tinged with yellow on the underwing, and tail coverts also on the outer edge of the wing. Length not quite 5 inches; of wing $2\frac{1}{2}$; bill and legs brownish black.

126.—*S. hippolais* ?—*Chif-chaff* of Europe.

I possess specimens of what I shall consider as this bird, till they have been examined and identified in Europe. I procured them in the elevated district of Wynaad, and on the Neilgherries. Two of the specimens have their plumage consisting entirely of green and yellow, but these, I see, are considered by Yarrell as young birds. They were seen hopping briskly about the branches of high trees. Irides light brown. Length $4\frac{6}{10}$ths; wing $2\frac{3}{10}$ths; tail $1\frac{8}{10}$ths; bill much wider than in the last species.

127.—*S. Indica.*—New species ?

This warbler somewhat approaches the description of *S. Javanica* of Horsfield, but differs in wanting the fulvous hue of the forehead and chin. I have hitherto seen it but rarely, and only in the more northern parts of the table land, during the cold weather. I saw it frequenting trees, hopping briskly about the smaller twigs; also on one occasion on a bush on the side of a precipitous rocky mountain.

Descr.—Above olive grey; beneath olivaceous yellow; eye-streak bright yellow; bill brown above, yellowish below; legs greenish brown. Length 5 inches; of wing $2\frac{4}{10}$ths; tail about 2; tarsus $\frac{8}{10}$ths.

Sub Family PARIANÆ.—*Tits.*

Sub Genus ZOSTEROPS, Horsf. and Vig.—*White-eye.*

128.—*Z. Maderaspatensis.*—*Mot. Maderaspatana*, L.—*S. leucops*, Vieill. Encycl. Meth. p. 441.—*S. palpebrosa*, Temm. P. C.—*Indian White-eye.*

This pretty plumaged little bird I have hitherto found in greatest abundance on the summit of the Neilgherries. Towards the more northern portion of the table land, it begins to occur, though sparingly, in the more wooded parts; and it is of tolerably frequent occurrence among the more wooded valleys of the northern ghauts. On the Neilgherries it frequents both the thick woods and gardens, and in the latter may often be seen clinging to the flower stalks, extracting the minute insects that infest flowers, by the pollen of which its forehead is often powdered. It feeds generally in small flocks, is lively and brisk in its movements, and keeps up a continual feeble twitter. Irides light yellowish brown; bill blackish; legs horn coloured. Length about $4\frac{1}{2}$ inches; wing $2\frac{3}{10}$ths; tail $1\frac{7}{10}$ths.

Sub Genus PARUS.—*Tit.*

129.—*P. atriceps*, Horsf.—*Black-headed Tit.*

I have only seen this Indian *Tit* towards the south of the peninsula on the Neilgherries, where it is common in the woods, associating in small families, and feeding on various insects and seeds, to obtain which it occasionally resorts to the gardens. I have seen it once or twice only along the range of northern ghauts, but it probably is to be found all along the range of western ghauts, as it is enumerated in the catalogues both of Colonel Sykes and Mr. Elliot.

130.—*P. Xanthogenys.*—*Yellow cheeked Tit.*

This species is also an inhabitant of the Neilgherries, but I only observed it in the warmer parts about the edges of the hills. I have

hitherto observed it in no other locality, but it is mentioned in Mr Elliot's catalogue, as well in Colonel Sykes'. Food and habits of the last. Irides light brown.

131.—*P. melanolophus*, Vigors.—Gould's Cent.

I have only observed this pretty little species in Goomsoor, where I found it frequenting lofty trees in open spaces in the jungle.

132.—*P.? minutus.*—New species?

I lately obtained in a wooded valley at the edge of the northern ghauts a single specimen of a small species of *Tit*, but unfortunately in imperfect plumage. It has the upper surface of the body of a greenish ash colour, tinged on the forehead, rump, and upper tail coverts with greenish yellow; beneath cinereous white, tinged in spots with light yellow; wing coverts edged with greenish yellow; bill and legs lead colour. Irides light brown. Total length about $3\frac{8}{10}$ths of an inch; of wing $2\frac{4}{10}$ths; tail $1\frac{1}{4}$; tarsus $\frac{5}{10}$ths. Its bill is larger, and less robust than in the *Tits*, in general approaching that of *Ægithalus*.

Sub Genus PARISOMA, Sw.?—Vieill.—Sect. 1. Swains.?

133.—*P.? vireoides.*—New species.?—*Olive Tit.*

This curious little bird appears to be a link joining the *Parianæ* to the *Vireoinæ*. It has the bill considerably more strongly developed than in *Parisoma*, as described and figured by Swainson, but as it otherwise appears to agree with it, may be considered as an aberrant species. I first obtained this *Tit* in open spaces in the jungle in Goomsoor, and have lately observed it in lofty trees towards the more northern portion of the table land. It associates in small flocks, and frequents the highest branches, hopping briskly about, and diligently examining the leaves, fruit and flowers for various insects. I found its food to consist of small spiders, insects, eggs and larvæ, aphides and various other minute insects.

Descr.—Above, greenish olive; wings and tail brownish; the feathers of the former edged with light olive, and those of the tail tipped with white; beneath, dirty greenish white; bill and legs lead colour. Irides orange yellow. Total length 4 inches; wing $2\frac{2}{10}$ths; tail $1\frac{2}{10}$ths; tarsus $\frac{5}{10}$ths.

SUB FAMILY MOTACILLINÆ.—*Wagtails.*

GEN. BUDYTES, CUV.

134.—*B. citreola.*—*Yellow headed Wagtail.*

This species is occasionally met with in most parts of India, during the cold season, but is not nearly so abundant as the next species. I have seen it on the banks of rivers, and also in wet paddy-fields.

135.—*B. neglecta,* Gould.—*B. Beema,* Sykes.—*B. flava,* of Continental authors.—*Peelkya,* H.—*Yellow Wagtail.*

The *B. Beema* of Sykes, appears to be identical with the species from the continent of Europe, lately pointed out by Gould, as differing from the *B. flava* of Britain.

The *Peelkya* is an extremely common bird in all parts of India, during the cold weather, remaining till April. It associates together occasionally in large flocks, frequenting damp spots of ground near tanks, and marshy places, but also the grain-fields, and dry plains, feeding among cattle. Single birds, however, or two or three together, are not uncommonly seen about houses, and in gardens, sometimes perching on trees, or the top of a house, or wall. It feeds on various minute insects and their larvæ.

136.—*B. melanocephala,* Sykes.—*Black headed Wagtail.*

I am very doubtful if this is a distinct species from the last. It is generally found in company with it, and I have seen many specimens during the moulting, when there were only a few feathers on the head, that had assumed the black. I have a specimen with the head of a lead colour, and a stripe from the angle of the mouth to the ears only black, without any superciliary stripe. This is probably the female, whether it be a distinct species, or only the winter plumage of the last. Habits and food, same as the last.

136.—bis.—*B. flava,* Ray, Gould.—*Yellow Wagtail* of British authors.

If the yellow superciliary mark be an unerring characteristic of this British bird, it may also be enumerated as a winter visitant to India. I have shot it in company with *B. neglecta,* and the last.

Gen. MOTACILLA, Auct.—*True Wagtail.*

137.—*M. boarula.—Wood* or *Jungle Wagtail.*

This species is numerous on the Neilgherries, where it frequents running streams, also enters gardens, &c. It is very abundant on the passes leading up to the hills, hopping along the road, and flying before a traveller, often for some distance. I have once or twice seen it lately in woody streams in the more northern portion of the table land, during the cold weather only.

138.—*M. Maderaspatensis,* Auct.—*M. picata,* Frankl.—*M. variegata,* Steph.—*Mhamoola,* H.—*Indian Black* and *White Wagtail.*

This species is found throughout the peninsula, only in beds of rivers. Length nearly 9 inches; tail 4; wing $3\frac{8}{10}$ths.

139.—*M. variegata,* Vieill.—Encycl. Method. p. 408.

I have not myself met with this species, which Mr. Elliot's notes have made known to me as an Indian bird, and from which I take the following description, " Above brown cinereous ; beneath white ; wings medial ; tail feathers (not the centre ones), and two chest-bands, black ; eye-brows, two diagonal bars on the coverts, and an imperfect third one on the quills, and ends of two outer rectrices, white ; two brownish lines down the throat. Length $6\frac{1}{2}$ inches." I see this is also enumerated by M. Lesson, as an inhabitant of Bengal.

140.—*M. alba,* Auct.—*Mot. Dukhunensis,* Sykes.—*Dhobeen,* H.

I have not hitherto observed this species in the Carnatic, but it is very common over most of the table land, during the cold weather only, migrating to the north, at the commencement of the hot season. It frequents rivers, open fields, gardens, villages, stable yards, &c., and occasionally even enters houses, feeding on a great variety of insects.

Genus ANTHUS.

I shall under this genus, enumerate two species, which although they do not exactly come under Swainson's restricted definition, are yet considered as *Anthi*, by most authors, and they have more of the manners of this family than of the *Larks*, with which Swainson has very properly, I think, associated most of the species, of the *Anthus*, of older authors.

141.—*A. arboreus ?—Tree Pipit ?.—Musarichee*, H.

This species, so much resembles the description of the *Tree Pipit* of Europe, that in the absence of more precise information, I shall consider it as such. It is only a visitor, during the cold weather, coming in October, and remaining till April or May. Associates generally in small flocks, frequenting beds of wooded streams, edges of tanks, and other moist places. Is also found in grain-fields, gardens, and groves of trees. It feeds partly on the ground, on various insects, and also on grain, and on being disturbed flies up to the nearest tree. It frequently, however, feeds on trees, hopping about the upper branches, like a *Sylvia*, and occasionally even snapping at an insect on the wing. Mr. Elliot says, " Its flesh is used by falconers as a restorative to the *Bhyree*, and is said to be very delicate.'' Length $6\frac{1}{2}$ inches; wing $3\frac{1}{2}$.

142.—*A. Richardi ?*

It is with some hesitation, that I consider the specimen, which I possess, to be the same as the *Anthus Richardi*, but as it appears to agree with many of the characters, as given in the descriptive works I possess, I shall do so provisionally, till correct information be obtained. I have only met with this bird, on one occasion, on the banks of the Tumbuddra. It was in pairs, and its manner of flight was exactly similar to that of the *Wagtails*.

Descr.—Above olive brown, shaded with dusky, and many of the feathers edged with whitish; beneath whitish, the breast streaked with brownish, and a brown streak running down from the base of lower mandible on either side. Irides brown. Length $7\frac{1}{2}$ inches; wing $3\frac{7}{10}$ths; tail about 3; tarsus $1\frac{2}{10}$ths; hind toe $1\frac{1}{10}$ths (with claw); claw alone $\frac{6}{10}$ths.

FAM. MUSCICAPIDÆ, Swains. ?

SUB FAM. MUSCICAPINÆ, Sw.—*True Flycatchers.*

GENUS RHIPIDURA, Vig. and Horsf.

SUB GENUS LEUCOCIRCA, Swains.—*Fantailed Flycatcher.*

143.—*L. albo-frontala.*—*R. albo-frontala,* Frankl.—*White browed Fantail.*—*Mucchureea* (i. e. *Mosquito catcher*), H.—*Manatee,* Mal.

This pretty and lively *Flycatcher,* is only to be met with in the southern parts of the peninsula, in well wooded districts, and open forest jungle, as in Travancore and Malabar. I have never seen it in the Carnatic. Towards the northern part of the table land, however, it is much more common, being met with during the cold weather in every clump of trees, and in wooded nullahs, indeed, throughout the year. It is a most active and restless little creature, continually flitting about, from branch to branch, snapping up an insect on the wing, every now and then, and raising its outspread tail, and lowering its wings, whenever it reseats itself on a twig. It is by far the most restless of all the Indian *Flycatchers,* seldom returning to the same perch, but traversing successively all the branches of the large trees it delights to frequent. It is by no means uncommon in gardens, seating itself on the sticks of peas or beans. I have once or twice seen it perched on the back of a cow, that was laying down beneath a tree, and pursuing insects from this unusual perch. I have also seen it on the ground, near a thick hedge side. It has a very sweet little song, which it warbles forth every now and then, consisting of several notes following each other regularly in the descending scale. Its chief food is small soft-winged insects, especially musquitoes. Its Malyalam name signifies '*washerwoman,*' and is given from the continual motion of its tail. Irides dark brown; bill and legs black. Length about 7 inches; tail 3 $\frac{7}{10}$ths; wing 3 $\frac{2}{10}$ths; tarsus $\frac{7}{16}$ths.

144.—*L. fuscoventris.*—*R. fuscoventris,* Frankl.

I have not hitherto shot this species, and have only once observed it in low bushy ground on the Neilgherries. Colonel Sykes mentions it as frequenting the same localities as the last species.

Genus MUSCICAPA, Auct.

Sub Genus CRYPTOLOPHA, Sw.

145.—*C. poioicephala,* Swains. Nat. Libr. vol. 21, Pl. 23.—*Grey-headed Flycatcher.*

The only locality in the more southern part of India, where I have met this curious little bird, is the summit of the Neilgherries, in the dense woods of which it is not very uncommon. In the northern part of the Deccan, however, it is occasionally to be met with, only in the cold season however, in large topes of trees, and it increases in number towards the north, and in the jungly valleys and nullahs of the northern ghauts, it is by no means rare, always frequenting by preference the deepest thickets. Though not so lively as the *Fantails,* it is yet more so than many of the *Flycatchers;* it frequently sallies forth from its perch on a twig after passing insects, and does not always return to the same branch, and often changes its perch, though it remains for some time in the same locality. It has a pleasant but feeble chirping note. Irides deep brown; bill brown above, pale beneath; legs reddish. Length rather better than 4½ inches; wing 2 $\frac{5}{10}$ths; tail 2 $\frac{2}{10}$ths; tarsus ½ inch.

Sub Genus MUSCIPETA, Cuv., Swains.

146.—*M. Paradisi,* Auct.—Sykes' Cat.—*Houssenee Bulbul,* H.—*Long tailed white Flycatcher.*

This most lively and elegant bird, is far from being common in any part of the peninsula, but is to be found in greatest plenty in the extensive woods of the western coast. Occasionally it is met with in the Carnatic, in the more wooded parts, and even in gardens, as also, though more rarely, on the table land. It feeds chiefly on insects caught on the wing, now and then snapping a caterpillar or other insect off a branch.

I never saw it feed on the ground, as mentioned by Colonel Sykes, nor have I usually found its food to consist of very minute insects, having on several occasions seen this as well as the next species, feasting on good sized caterpillars, but my opportunities of observing it have hitherto been few. This, as well as the *Sultana Bulbul,* are certainly

less sedentary in their habits, than the true *Muscicapæ*, and have the habit of wandering more from tree to tree, and less frequently returning to the same perch. This, in accordance with Le Vaillant's observations, as mentioned by Swainson. The flight of this species is very elegant. I always observed it single. I have not had the means hitherto of verifying Colonel Sykes' remarks on the females of this, and the next species. The female of this as described by Colonel Sykes, appears to be identical with the supposed new species of Swainson, figured in his volume on *Flycatchers*, in the Naturalists' Library, under the name of *M. leucogaster*. Length about 10 inches; of wing $3\frac{8}{10}$th; tail 5 to 6 inches; tarsus $\frac{7}{10}$ths; bill to front $\frac{7}{10}$ths; at gape $1\frac{1}{10}$th; bill and naked skin round eye of a delicate lilac blue colour; feet plumbeous. Irides deep brown.

147.—*M. Indica*, Steph.—*M. castanea*, Temm.—*Shah Bulbul*, or *Sultana Bulbul*, H.—*Long-tailed red Flycatcher.*

The *Sultana Bulbul* is more common, and more generally spread than the last, though far from being abundant. Food, manners and habits of the last. Dimensions, &c. as in *M. Paradisi.*

Sub Genus MUSCICAPA, Sw.

148.—*M. cærulea*, Veiell. Encyl. p. 807.—*M. occipitalis*, Vig. Proc. Z. S. for 1831.—*Black-naped Blue Flycatcher.*—*M. cæruleocephala*, Sykes' Cat. Young bird ?—*Gobe-mouche bleu des Philippines*, Buffon. *Pl. En.* No. 666, fig. 1.

The *M. occipitalis* of Vigors, appears to be identical with the bird previously named as above. It is very rare in the peninsula. I have only seen it twice, once on the Coonoor pass of the Neilgherries, and again in the Wynaad, in both places in dense jungle. I have also seen a specimen shot in the Malabar Coast. At the times I observed, it was flying from tree to tree, remaining on each a short time, and capturing an insect or two, and then resuming its flight. The form of this *Flycatcher* is peculiarly slender and delicate, differing much from the more rounded and compact forms of the true *Muscicapæ*. Irides deep brown; bill bluish; legs bluish black. Length 6 inches; of wing to end of 5th quill $2\frac{8}{10}$ths; of tail $2\frac{3}{4}$; tarsus $\frac{7}{10}$ths; bill to front $\frac{4}{10}$ths; to gape $\frac{6}{10}$ths. This is evidently an aberrant species, leading to *Myia-*

gra by its long tail (which is slightly rounded), and other peculiarities of form.

149.—*M. pallipes.*—New species ?—*M. Indigo,* Horsf. ?—*White bellied blue Flycatcher.*

This species resembles much the description of *M. Indigo* of Horsfield, but that is said to be only $4\frac{1}{2}$ inches long (Griff. Cuvier), and is therefore perhaps distinct. I have only shot a single specimen of this species, in thick forest on the Coonoor ghaut, where I observed it darting on insects from its perch on a low branch.

Descr.—Entirely of a deep indigo blue, except belly and under tail coverts, which are white; wings and tail dusky on their inner webs; bill, black; legs, feet, and claws pale whitish flesh-colour. Irides deep brown. Length about $6\frac{1}{2}$ inches; of wing $3\frac{1}{10}$ths; tail $2\frac{1}{2}$; tarsus more than $\frac{7}{10}$ths; bill to front about $\frac{5}{10}$ths; to gape $\frac{8}{10}$ths; the 5th and 6th quills are subequal and longest, and the tail is nearly even.

150.—*M. Banyumas,* Horsf.—*Red breasted blue Flycatcher.*

This pretty little species, is spread, though sparingly, throughout India, and I have met it wherever there was much wood, in Goomsoor, in the Northern Circars, at the Tapoor pass, in the Carnatic, and on the west coast, where it is of tolerably frequent occurrence. I have also seen it in the northern part of the bare table land, once in a clump of trees near a village, and again in a jungly nullah. It feeds in general, like its congeners, from a fixed perch, catching its prey on the wing, but I have repeatedly seen it descend to the ground to pick up an insect, and even hop a step or two whilst down.

The structure of its bill is similar to that of the last, viz. long and tapering, and the 4th and 5th quills are subequal and longest; bill black; legs brownish. Irides deep brown. Length rather more than $5\frac{1}{2}$ inches; wing $2\frac{9}{10}$ths; tail $2\frac{3}{10}$ths; tarsus $\frac{7}{10}$ths; bill to front $\frac{4}{10}$ths; to gape $\frac{7}{10}$ths.

151.—*M. melanops,* Vig.—Gould's Cent.—*Pale blue Flycatcher.*

I possess two specimens, of what I consider to be this species, as well from the drawing in Gould's Century, as from the description. The one I procured in Goomsoor, the other in a jungly valley at the edge

of the northern ghauts near Ajunteh. It captures its insect prey on the wing, as well as occasionally on the ground, returning to the same perch. Length about 6 inches; of wing 3 $\frac{3}{10}$ths; tail 3 inches; tarsus $\frac{6}{10}$ths; bill to front $\frac{3}{10}$ths; to gape $\frac{6}{10}$ths; bill and legs black. Irides deep brown; bill short triangular—4th quill the longest, 3d subequal to the 5th.

152.—*M. albi-caudata.*—New species?—*M. thalassina,* Swains.?—*White tailed* or *Neilgherry Blue Flycatcher.*

Descr.—Of a deep indigo blue colour, inclining to lazuline on the forehead, head and shoulders; belly ashy blue mingled with whitish; under tail covert whitish, barred with dusky blue; wings and tail dusky black; the feathers edged with blue, and those of the tail (the centre feathers excepted) white at their base; bill and legs black. Irides deep brown. Length 6½ inches; of wing 3 $\frac{2}{10}$ths; tail 2 $\frac{6}{10}$ths; tarsus $\frac{7}{10}$ths; bill to front $\frac{4}{10}$ths; to gape $\frac{7}{10}$ths; bill rather longer and less triangular than in *M. melanops,* not so long as in *M. pallipes* and *M. banyumas*—4th and 5th quills equal and longest.

I have hitherto only found this species on the Neilgherries, in the dense woods of which it is far from being uncommon. It captures insects of various kinds on the wing, from a fixed perch, occasionally a small flock of five or six of them are seen together in a state of continual movement, taking short darts and gambols in the air, as much in sport apparently, as in actual pursuit of insects.

153.—*M. superciliaris.*—New species?.—*White browed blue Flycatcher.*

Descr.—Above and sides of the breast, of a beautiful light indigo, or rather prussian blue, beneath; superciliary stripe extending to some distance behind the eyes, and base of the tail; feathers (except the central ones), pure snowy white. Some of the feathers of the rump with the shaft, and a bar in the middle of the feather, also white; bill and legs black. Irides deep brown. Length 4¾ inches; wing 2 $\frac{5}{10}$ths; tail 1 $\frac{8}{10}$ths; tarsus $\frac{6}{10}$ths; bill to front $\frac{3}{10}$ths; to gape $\frac{6}{10}$ths; bill more lengthened than in the two last, very little compressed; wings with 4th quill longest, 3d and 5th subequal.

I lately obtained a single specimen of this beautiful little species, in a wooded valley, at the edge of the range of northern ghauts.

154.—*M. Poonensis,* Sykes.—*M. latirostris,* Swains. Nat. Lib. vol. 21?—*Zukkee,* H.—*Indian Grey Flycatcher.*

I possess two specimens, which, as they differ only in size, I consider as identical with the species named as above by Colonel Sykes, and Swainson's supposed new species does not appear to differ from them. The smaller of my specimens was procured in the hot Carnatic, near Trichinopoly, the larger one on the Coonoor pass of the Neilgherries, at a considerable height. I have observed it on several other occasions, both in the Carnatic, and on the Malabar Coast. It feeds on insects, which it captures on the wing from a fixed perch, and it is, I think, more sedentary in its habits than any of the previously described *Flycatchers*. Bill blackish above, whitish below, except at tip; irides deep brown; legs brown. Length of my specimens 5 and $5\frac{3}{4}$ inches; of the first, the wing is $2\frac{7}{10}$ths; tail 2; tarsus $\frac{5}{10}$ths; bill to front $\frac{4}{10}$ths; to gape nearly $\frac{7}{10}$ths. In the larger one the wing is $2\frac{1}{10}$ths. In both the 3d and 4th quills are equal and longest.

155.—*M. hirundinacea*, Horsf., Temm.—*M. picata*, Sykes.—*Tephrodornis hirundinaceus*, Sw.?—*Black and white Flycatcher.*

This bird has so much the habits, as well the general structure and appearance of a *Flycatcher*, that I shall for the present here retain it, and a closely allied species, although Mr. Swainson has, I see, ranged it as a *Tephrodornis.*—Vide remarks *postea.*

I have only hitherto seen it on the Neilgherries, where it is not very uncommon in the woods, darting upon insects in the air from a branch, and though perhaps it wanders about more than many of the genus, is yet not nearly so restless as the *Fantails.* Bill and legs black; irides sienna yellow. Length $5\frac{1}{2}$ to 6 inches; of wing $2\frac{9}{10}$ths; of tail $2\frac{4}{10}$ths; tarsus nearly $\frac{1}{2}$ inch; bill to front $\frac{4}{10}$ths; at gape $\frac{7}{10}$ths.

156.—*M. erythropygia.*—New species?—*Tephrodornis?*—*Red breasted Flycatcher.*

Descr.—Male:—plumage above, cheeks and chin, of a glossy blue black; beneath, longitudinal stripe on the wings, and outer edges and tips of the lateral tail feathers, white; breast and rump of a beautiful orange red, darkest on the rump.

Female,—with the parts black in the male, of an ashy brown (except the tail which is deep black); feathers at the base of the bill above whitish; rump, outer edges and tips of the lateral tail feathers, and beneath, white, tinged with ashy on the breast. Bill and legs black;

irides brownish yellow. Length $6\frac{1}{2}$ inches; of wing $2\frac{7}{10}$ths; tail $3\frac{3}{10}$ths; tarsus $\frac{1}{2}$ inch; bill to front $\frac{3}{10}$ths; at gape $\frac{6\frac{1}{3}}{10}$ths.

I have only once seen this prettily marked species, in low and thick jungle on the top of the ghauts, near Ajunteh, when I fortunately procured both male and female. I found fragments of various insects in their stomachs, but had no opportunity of observing their manner of feeding or other habits.

These two last species certainly differ from *Muscicapa* in some particulars. Their tarsi are distinctly scaled, and the bill (especially of the former species), is stronger, more *shrike*-like, and less depressed; but their small size, the habits as observed of the first species, and general appearance, led me in the first instance to overlook these differences, and I had not observed that Swainson had described the first as a *Tephrodornis*, when I was enumerating the species of that genus.

Tribe CONIROSTRES.

Family CORVIDÆ.

Sub Family CORVINÆ.

Genus CORVUS.—*Crow.*

157.—*C. splendens*, Vieill.—*Patee Kowa*, H.—*Common Crow.*

This is the common crow of India, and is most abundant every where, roosting on high trees, and spreading in the morning through villages, and cantonments, &c. It is a most familiar, noisy and impudent bird. It breeds on trees in the hot weather.

158.—*C. macrorhynchos*, Wagl.—*C. culminatus*, Sykes.—*C. corone*, var., Frankl. Cat.—*Dheree Kowa* or *Kurrial*, H.—*Large black crow.*—*Indian Carrion Crow.*

This species, though not so numerous as the last, is yet very abundant, and nearly equally troublesome and impudent. It partakes more readily than the last of carrion, and I think the *King Crows* appear to pursue it with greater hatred than the common crow, so it probably

occasionally pilfers their eggs or young. Irides dark brown; bill and legs black. Length 21 inches; of wing $13\frac{4}{10}$ths; tail $7\frac{3}{4}$; tarsus $2\frac{1}{2}$; bill to front $2\frac{4}{10}$ths; at gape $2\frac{1}{2}$.

Sub Family GLAUCOPINÆ, Swains.

Genus CRYPSIRINA, Vieill.—Dendrocitta, Gould.—*Tree Crow*, or *Magpie*.

As Swainson asserts the identity of these two genera, I take the former as being the legal generic name.

159.—*C. vagabunda.*—*Pica vagabunda*, Gould's Cent. pl. 42.—Gray and Hardw. Ill. I. Z.—*Coracias vagabundus*, Lath.—*Maha Lat*, H. of some *Shikarees.*—*Indian Magpie.*

This bird, the *Indian Magpie*, is generally spread throughout the South of India, but is only at all plentiful on the well wooded western coast, where it is to be seen and heard in every lofty avenue. In the Carnatic, I have only seen it in the jungly district near Touremcourchy, and in the table land it is also rare, being met with only occasionally in jungly districts, or in the neighbourhood of well wooded villages. It frequents the highest jungles occasionally, not in their densest portions, however. This bird is found single or in pairs, occasionally four or five being seen together. It lives, as far as I have ascertained, entirely on fruit of different kinds, and is very fond of the fruit of the banian. It has a most peculiar cry, something like the metallic sound of the call of the *Racket-tailed Drongo (Dicrurus retifer)*, but its usual call is a harsh rattling cry, like that of the European *Magpie.* Irides blood red; bill black; legs slate colour. It is considered by the natives as a kind of *Shrike.* Length about 16 inches; wing 6; tail 10; tarsus $1\frac{3}{10}$ths; bill straight to gape $1\frac{2}{10}$ths.

160.—*C. lencogastra.*—*Dendrocitta lencogastra*, Gould, Trans. Zool. Soc. vol. 1, pl. 12.—*Long tailed Magpie.*

This very elegant species is much more rare than the last. I have only seen it in the jungles of Malabar and the Wynaad. It frequents the densest portions of the jungles, and is extremely shy and wary, feeding like the last on various fruit and berries. It has a somewhat

similar call. Irides blood red; bill black; feet plumbeous. Length $18\frac{1}{2}$ to 19 inches; wing $5\frac{3}{4}$; tail 12; tarsus $1\frac{3}{10}$ths; bill straight to gape $1\frac{2}{10}$ths.

161.—*C. Sinensis.*—*Pica sinensis*, Gould's Cent. Him. Birds, pl. 43.

I have hitherto not been fortunate enough to procure this bird, though I think I have observed it in open jungle on the Segoor pass of the Neilgherries; but I have seen specimens, killed in the eastern range of ghauts.

FAMILY STURNIDÆ.—*Starlings.*

SUB FAMILY STURNINÆ, Swains.

GENUS STURNUS, Lin.

162.—*S. contra*, Gmel.—*S. capensis*, Lath.—*Pastor Contra*, Wagl.—Buffon P. E. 280.—*Indian Starling.*

The *Indian Starling* occurs in great abundance in the district of the Northern Circars, but, as far as I can learn, in no other part of the peninsula of India. I first met it a few miles to the north of Vizagapatam, and saw it afterwards throughout the whole district to the northward, as far as the Goomsoor country, where it is very numerous. It lives in large flocks, feeding on the ground and associates freely with the common *Myna.*

I know not if it remains here during the whole season. I saw it in the cold weather. Length $8\frac{1}{2}$ inches; wing $4\frac{6}{10}$ths; tail $2\frac{3}{4}$; tarsus $1\frac{3}{10}$ths; bill to front $\frac{9}{10}$ths; straight to gape $1\frac{7}{10}$ths.

GENUS PASTOR.—*Myna*, H.

163.—*P. tristis*, Temm.—*Gracula tristis*, Lath.—*Grac. gryllivora Dand*, Buffon P. E. 219.—*Myna*, H.—*Saloonkee*, Mah.—*Gorwuntra Cau.*—*Common Myna.*

This well known and common bird is found throughout India, preferring the neighbourhood of cultivation and villages, and never found in high or dense jungle. It roosts in numerous flocks, generally on high trees, and disperses in various parties of two, four, six, or more, about sun-rise. Some enter the villages and cantonments, others attend flocks of sheep or cattle, which they follow while grazing, feeding on the grasshoppers and other insects, disturbed by the treading of the cattle. The *Myna* also will feed on grain, and seeds of various kinds, and is very fond of white ants. Its flight is swift, steady and direct. It breeds, I am informed, in the holes of old trees, walls, old buildings, &c., during the hot weather, and is said to have 3 or 4 eggs of a greenish blue colour. It is very often taken when young, and caged, becoming very familiar, and learning to repeat words and sentences with great ease. Its cries are many and varied, most of them harsh, loud and disagreeable, but it has also some sweet and agreeable notes. Length varies from 10½ to nearly 12 inches. Irides reddish brown, studded (as Colonel Sykes remarks) with whitish specks on their external margin; bill and legs yellow; naked skin round eyes, orange yellow.

164.—*P. fuscus*, Wagl. ?—*P. Mahrattensis*, Sykes ?—*Hill Myna.*

This very closely allied species, I have found, in greatest abundance, on the Neilgherries, where it accompanies cattle like the last (whose place it supplies here), and also frequents gardens, eating various seeds, and fruit. I have also seen this species in the Wynaad, and I think, on one occasion, in Mysore. I have united Colonel Sykes' name to that previously given by Wagler, and have little doubt but that they are the same bird. Colonel Sykes however, says " possesses no crest," and Wagler does not mention one, though he probably infers it, as he says, " very similar to *P. Tristis.*" Now my specimens, though they have not the flowing crest of the common *Myna*, have the feathers of the head lengthened, and those of the forehead are somewhat raised, as in *P. cristatellus*. It has not the naked yellow skin round the eye of *P. tristis*. Length 9 to 9½ inches; wing 5; tail 3; tarsus 1 $\frac{4}{10}$ths; bill to front nearly $\frac{7}{10}$ths; at gape 1 $\frac{2}{10}$ths. Irides greyish white; bill orange yellow; feet gamboge yellow.

165.—*P. pagodarum*, Temm.—*Turdus pagodarum*, Gmel.—*Le Martin Brame*, Le Vaill. *Ois. D'Afr.* pl. 95-2.—*Popoya Myna*, H.—*Brahminy Myna* of Europeans in India.

The Carnatic appears to be the head quarters of this species of *Myna*, as it is the only district in which it can be said to be numerous. I did not observe it in the Northern Circars, nor in the wooded region of the west coast, though I doubt not, that it may occur occasionally in both regions, and in the central table land of the peninsula. I have only observed it rarely, few in number, and in the cold season. In the Carnatic (as about Madras and Trichinopoly) it is extremely abundant, feeds chiefly on the ground, on grasshoppers, and other insects, in small parties, and is very sprightly and active; walking and hopping about, sometimes in company with the common *Myna*, and often seen among cattle. It also, however, feeds on trees, on various fruit, berries and flower buds, and this seems to be its usual habit on the few occasions I have observed it out of the Carnatic. Its notes are somewhat similar to those of the common *Myna*. It has also, however, a pleasant song. Length 8 to $8\frac{1}{2}$ inches; wing $4\frac{2}{10}$ths; tail $2\frac{1}{2}$ to 3; tarsus $1\frac{1}{10}$th; bill (to front) $\frac{6}{10}$ths; at gape 1 inch. Irides greenish white; bill at base blue, then greenish, and yellow at tip; legs bright yellow.

166.—*P. Malabaricus.*—*Turdus Malabaricus*, Gmel.—*Le Martin Vieillard*, Lesson.—*White headed Myna.*

Wagler has committed a capital mistake when he pronounces this to be the adult female of the last, and shews how much caution should be used by naturalists at home, before deciding on the identity of birds, whose general appearance and structure is similar, though in this case the difference of structure, as well as of plumage, might have suggested the contrary opinion. The *white headed Myna* is only found, as far as I am aware, in the lofty jungles of the Malabar coast, frequenting high trees in the more open spaces of the jungle, living in small families, and feeding chiefly on various kinds of insects, larvæ, and in one or two instances, as I found, on small snails. It climbs about the trunk and branches of trees with great facility, and never that I observed, descends to the ground. It has a very sweet song. Mr. Elliot mentions it as found in the forests of the Southern Mahratta Country, but as it is not included in Colonel Sykes' catalogue, it probably does not extend so far to the northward as his district. Feathers of the head and neck beautifully white, and silky in adult specimens. In some birds the white of the neck extends over the breast, and part of the belly, nearly hiding the usual rufous tint of those parts. Irides, greyish white;

bill blue at base, greenish in centre and yellow at tip; legs reddish yellow; claws pale yellow. Length 8 to $8\frac{1}{2}$ inches; wing $4\frac{2}{10}$ths; tail $2\frac{7}{10}$ths to 3; tarsus 1 inch; bill to front $\frac{7}{10}$ths; at gape $1\frac{1}{10}$th.

I may here mention, that I think there exists another species of *Pastor*, nearly allied to this, and differing only in size and in the colour of the head and neck, which are permanently grey, instead of assuming a white plumage. I possess only one specimen of this bird, shot in the Northern Circars, but have seen and shot it in the Carnatic, during the cold season, frequenting the tops of high trees. It may be considered as the young of *P. pagodarum*, but besides the difference of size, and various peculiarities of both plumage and structure, as I never saw it in company with it, and have reason to believe that the young birds of the latter early assume the black colour of the head, I think it certainly distinct. Again it may be considered as the young of the *P. Malabaricus*, to which it has certainly a strong resemblance; but as I never saw that species in the Carnatic, nor in the Northern Circars, I think that this supposition is also unlikely. If distinct, it may be named *P. cinereus*. Is this the *Gracula cinerea* from Bengal, mentioned in Lesson's *Traite?* Length of my specimen $7\frac{1}{2}$ inches; of wing 4; tail $2\frac{1}{2}$; tarsus barely 1; bill to front $\frac{6}{10}$ths; at gape about 1 inch. Bill and legs as in *Past. Malabaricus*, except that the bill is yellow only at the tip, instead of for more than half its length.

167 —*P. roseus*, Temm.—*Turdus roseus*, Gmel., Lath.—*Tillyer*, H.—*Cholum bird* of Europeans in the Carnatic.

This well known species makes its appearance in the peninsula of India about the end of November, or beginning of December: associates in vast flocks, and commits great havoc on the grain-fields, especially in those of *Cholum* (or *Joaree*,) (*Andropogon Sorghum*), whence its common name. When the grain is cut, it occasionally feeds on insects, seeking them on the ground, also on various grass seeds, fruit and flower buds. It disappears in March, though straggling parties are met with even in April. The majority of birds in a flock are in imperfect plumage, the delicate salmon colour of the adult bird being replaced by a dirty fawn colour.

I extract from Mr. Elliot's notes the following interesting observations on this species. " Is very voracious and injurious to the crops, particularly to the white *Jowaree*, in the fields of which the farmer is obliged to station numerous watchers, who, with slings, and a long rope

or thong (which they crack dexterously, making a loud report), endeavour to drive the depredators away. The moment the sun appears above the horizon, the *Tillyers* are on the wing, and at the same instant shouts, cries and the cracking of the long whips, resound from every side. The *Tillyers*, however, are so active that if they are able to alight on the stalks for an instant, they can pick out several grains. About 9 or 10 o'clock A. M. the exertions of the watchmen cease, and the *Tillyers* do not renew their plundering till the evening. After sun-set they are seen in flocks of many thousands, retiring to the trees and jungles for the night. They prefer the half ripe *Jowarree*, whilst the farinaceous matter is still soft and milky." Length 9 to 9½ inches; wing 5¼; tail 3; tarsus nearly 1 $\frac{3}{10}$ths; bill to front $\frac{7\frac{1}{2}}{10}$ths; at gape 1 $\frac{1}{10}$th. Irides deep brown; bill orange yellow at the base, then pinkish, and brown at the point; legs dusky reddish.

GENUS GRACULA, L.—EULABES, CUV.

168.—*G. religiosa*, L.—*Koknee Myna*, H.—*Wattled* or *Jungle Myna.*

This species is only found in lofty jungle, as well in the east as on the west coast. It is by no means common, and seems very partially distributed, as you may pass through miles of forest without seeing a single specimen. It is generally found in small parties of five or six frequenting the tops of the loftiest trees, and feeding on fruit and berries of various kinds. I never found that insects had formed any portion of its food. The song of this bird is very rich, varied and pleasing, it has, however, several harsher notes frequently heard in the jungles it frequents. The *Jungle Myna* is now not often seen in cages in the South of India, but it is very highly prized, both for its powers of song and speech, which are said to surpass those of all other birds in distinctness. Irides deep hazel brown; bill and wattles orange yellow; legs bright yellow. Length 10 inches; wing 5 $\frac{6}{10}$ths; tail 2 $\frac{8}{10}$ths; tarsus 1$\frac{2}{10}$ths; bill straight to front 1; at gape 1 $\frac{3}{10}$ths.

It has probably been from erroneous information that this species was named '*religiosa*' by Linnæus, as I am not aware of its being considered sacred by the Hindoos, whereas the *Pastor Tristis*, or *common Myna* is, as I learn from Mr. Elliot's notes, sacred to *Ram-deo*, on whose hand it sits.

FAMILY FRINGILLIDÆ, Finches.

SUB FAMILY COCCOTHRAUSTINÆ, Swains.—*Hard-bills.*

GENUS EUPLECTES, Swains.—PLOCEUS, Auct.

169.—*E. Philippensis.*—*Ploc. Philipensis*, Auct.—*Baya*, H.—*Weaver Bird.*

The weaver bird is found over all the peninsula, but much more abundantly in some situations than in others, being common in the more wooded districts, and though not rare, far from common in the Carnatic, and the bare table land, as you may often pass over large tracts of country without ever seeing it, while in particular spots you find a tolerably large colony of them. The *Baya* associates in numerous flocks, generally builds in company, and almost always in the close vicinity of water. Its long bottle-shaped nest is well known. It feeds on various grass seeds, and also grain, associating sometimes with the *Emberiza melanocephala*, and sometimes as Colonel Sykes observes, with the house sparrows. The flock keeps up a continual chirping. It breeds, I am told, towards the end of the monsoon, and the young ones are ready to fly about the ripening of the first crops of grain. Length about 6 inches; of wing 2 $\frac{8}{10}$ths; tail 2; tarsus $\frac{9}{10}$ths. Irides dark brown; bill black; legs yellowish.

170.—*E. Bengalensis.*—*Loxia Bengalensis*, Auct—*Cocc. chrysocephala*, Vieill.—*Le gros bec Orchef*, Vieill. Encyl. Meth. p. 1008.—*E. albirostris*, Sw.?—*Bahmunee Baya*, H.

I have not myself met with this species, but find it recorded in Mr. Elliot's notes, as found occasionally in the Southern Mahratta Country. That gentleman says that, "the male has the yellow crown only in the breeding season. At other times only eyebrow and ear spot are yellow. Their nests, though similar, are smaller than those of the common *Baya*, and have two chambers. Habits the same as those of the *Baya*. Length 6 inches."

Major Franklin, I see, has ranged this bird, as an *Emberiza*, but says its Indian name is *Baya*, and Mr. Elliot calls it a *Ploceus*; so, although I have not seen it, I range it unhesitatingly as an *Euplectes* of Swainson.

GENUS AMADINA, Swains.

SUB GENUS ESTRELDA, Swains.

171.—*E. amandava.*—*Fringilla amandava*, L.—*Lal* (the male), *Mooneah* (the female), H.

This pretty little bird is far from being common in the South of India. I have seen it in greatest abundance on the top of the Neilgherries, where it frequents meadows and bushy ground, but frequently also enters gardens, and is considered destructive to various seeds, buds, &c. I have seen it only once or twice in the Deccan, in the neighbourhood of well wooded towns. It is said to be common in some parts of Mysore. Mr. Elliot says, "It is common in Dharwar, particularly in the sugar-cane fields, along with *Spermestes Malacca.* Though I have never myself observed it in the Carnatic, I am informed it is met with in some districts, especially about Arcot, and that it builds its nest of well woven grass, attaching it to a stalk of *rawala.* It is caught in great quantities in certain parts, and kept in cages with the next and other species. It is said to fight with great courage (for which purpose it is kept by the natives), and that it will continue the combat till blood is drawn on one or both sides. Length 4¼ inches; wing 2; tail 1½; tarsus rather more than ½ an inch; bill to front $\frac{3}{10}$ths.

SUB GENUS SPERMESTES, Swains.—LONCHURA, Sykes.

The next four species most probably belong to Swainson's genus *Spermestes,* though they are probably aberrant species, leading to *Erythura,* by their slightly acuminated tail.

172.—*S. nisoria,* Temm. P. C. 500-2.—*Loxia punctularia,* Auct.?—*Sing baz* or *sheen baz,* H.—*Chesnut throated finch.*

I have hitherto only found this pretty species on the Neilgherries, frequenting long grass and bushes, and feeding on various seeds in small parties of 4 or 5. I am informed, however, that it is met occasionally in various parts of the country, as in Mysore, and some of the more wooded spots, near large towns in the table land. It is enumerated both in Mr. Elliot's and Colonel Syke's catalogues. The upper tail coverts have a strong yellow tinge, and a glistening waxy sort of lustre. Bill and legs, slate blue; irides dark brown. Length 4½; wing 2$\frac{2}{10}$ths; tail 1½; tarsus $\frac{6}{10}$ths; bill at front $\frac{4}{10}$ths.

173.—*S. leuconota.—F. leuconota,* Temm., P. C. 500—1.—*Lox. striata,* Lath. ?—*White rumped Finch.*

I have only hitherto observed this species in the Malabar coast, and the Wynaad, frequenting grain-fields, open spaces in the jungle, and occasionally seen on the road-side, and even in stable yards, feeding on various kinds of grain and seeds. It lives in small flocks of six, eight or more. Irides dark brown; bill and legs, slate blue. Length $4\frac{4}{10}$ths; wing $2\frac{1}{10}$th; tail $1\frac{6}{10}$ths; tarsus $\frac{5\frac{1}{2}}{10}$ths; bill to front $\frac{4}{10}$ths.

174.—*S. Malacca.—Loxia Malacca,* Auct. ?—*Nukl-nore,* H.—*Black-headed Finch.*

The *nukl-nore* so nearly approaches the description of the *Loxia Malacca* of authors, that I shall here consider it as the same. I have seen this bird in the Carnatic, frequenting long reeds and grass, by the side of rivers, in the table land in similar situations, though more rare, and most numerous in the wooded region of the west coast, frequenting grain-fields in large flocks along with the last species.

I shall here add a brief description. Male,—head, neck and breast of a rich black; body above of a chestnut brown; the upper tail coverts of a brighter tinge, and with a glistening lustre, as in *S. nisoria,* belly white with large central spot and vent black; bill bluish at base, yellowish at tip; legs plumbeous. Length $4\frac{3}{4}$; wing $2\frac{2}{10}$ths; tail $1\frac{4}{10}$ths; tarsus $\frac{6\frac{1}{2}}{10}$ths; bill at front $\frac{4\frac{1}{2}}{10}$ths. Irides dark brown. Female—or young ?—above of a pale cinnamon brown, darkest on the head; beneath rufous white, darkest on throat and neck.

175.—*S. cheet.—Lonchura cheet,* Sykes.—*Pidderee,* H.—*Small brown Finch.*

This plain coloured little *finch* is found all over the peninsula, living in families, and frequenting hedges, low trees in cultivated ground, and low bushes on the open plain, or by a river side. It frequently enters gardens, and feeds on various kinds of seeds. Colonel Sykes describes its nest as being formed of grass, in the shape of a hollow ball, and that he found in one nest ten white eggs, not much larger than peas. Irides deep brown; bill bluish; legs dirty reddish. Length about 5 inches; tail 2.

SUB FAMILY FRINGILLINÆ.—*Ground Finches.*

GENUS PYRGITA, Swains.

176.—*P. domestica.—Chooree,* H.—*Common House Sparrow.*

The *Sparrow* is found all over India, even its hottest parts. It is least common on the wooded west coast, and Quilon is said to be exempt from its society, as well as from that of the common squirrel (*Se-palmarum*), two of the greatest pests of most other stations.

177.—*P. flavicollis.—Fringilla flavicollis,* Frankl.—*Rujjee,* H—*vulgo Junglee chooree,* i. e. *Jungle Sparrow.—Yellow necked* or *Jungle Sparrow.*

The *yellow necked sparrow* is found all over the peninsula, wherever there are abundance of trees, but it cannot be said to be a common bird any where, even in the well wooded region of the west coast, where it is more plentiful than in any other part of the peninsula. It frequents thin jungle, groves of trees, avenues, &c.; lives in small flocks, and has almost exactly the same chirping note as the common sparrow. It feeds on various seeds, grain and flower buds. It is said to breed in holes of trees. Mr. Elliot says "also breeds on old pots, and on house tops." The egg is of a greenish white, much streaked and blotched with purple brown. I obtained one from the body of a female. Colonel Sykes has placed it as a *Ploceus,* but its habits, as well as its structure, and the similarity of its notes to those of the common sparrow, have led me to replace it among the sparrows. Length $5\frac{1}{2}$ inches; wing $3\frac{3}{10}$ths; tail 2; tarsus $\frac{7}{10}$ths; bill to front $\frac{4}{10}$ths; bill black; legs cinereous; irides brown.

178.—*P.? concolor.*—New species.?

I have but a single specimen of the bird I am about to describe, which was shot on the ground in an open plain, along with a lot of the *Indian Ortolan* (*Alauda Dukhunensis,* Sykes). It does not exactly agree with the characters of *Pyrgita,* having the bill more turgid, and with the commissure slightly sinuated. The third quill is shorter than the two first, and the inner toe is shorter than the outer one, its claws moreover are less curved. I cannot, however, range it under any other of Swainson's genera, so prefer retaining it here.

Descr.—Of an uniform light ashy brown colour, lightest below (almost white indeed at chin and vent), and darkest on the quills and

tail. Length 6 inches; wing $3\frac{8}{10}$ths; tail $2\frac{1}{4}$; tarsus rather more than $\frac{7}{10}$ths; bill at front $\frac{4}{10}$ths. Irides brown; bill brown above, yellowish below; legs flesh coloured yellow.

GENUS EMBERIZA, Auct.—*Bunting.*

179.—*E. melanocephala,* Auct.—*Gundum,* H.—*Black-headed Bunting.*

I do not recollect having seen the *Gundum* in the Carnatic. It makes its appearance on the table land, about the end of November, or beginning of December; associates in numerous flocks, and is very destructive to grain-fields. Few of the birds are found in perfect plumage. Length $7\frac{1}{4}$ to 8 inches; wing $3\frac{8}{10}$ths; tail 3; tarsus $\frac{9}{10}$ths; bill to front $\frac{5}{10}$ths.

180.—*E. ortolana,* Auct.—Sykes' Cat.—*Ortolan* of Europe.

I have not hitherto met with the *Ortolan* of Europe.

181.—*E. cia ?—Putthur Chirta,* H.—*Bush or hedge Bunting.*

Though I have great doubts whether this bird is the *E. cia* of authors, yet as it approaches nearly the description of that bird, and moreover is only a winter visitant to the peninsula, I think it may turn out to be identical with it.

This *bunting* is found only in the more northern parts of the table land, during the cold weather, frequenting hedges and trees in the neighbourhood of cultivation, also bushy wilds. It feeds on various grains and seeds. Found sometimes single or in pairs, at times in numerous flocks. I shall add a brief description.

Plumage above cinereous, tinged with reddish on the back and rump; beneath lighter cinereous, strongly tinged with reddish fawn colour, on throat and breast, passing into reddish white, or pale fawn colour on the belly and vent; chin whitish. Wings and tail dark brown, broadly edged with reddish fawn; outer feathers of the tail white on their inner webs. Irides brown; bill reddish; feet yellow. Length $6\frac{1}{2}$ inches; wing $3\frac{1}{2}$; tail $2\frac{1}{2}$; tarsus $7\frac{1}{2}$ tenths; bill to front hardly $\frac{4}{10}$ ths.

182.—*E. cristata,* Vigors.—Sykes' Cat.—*Crested black Bunting.*

183.—*E. sub-cristata*, Sykes' Cat.—*Crested brown Bunting.*

I have not hitherto been fortunate enough to observe either of these species of *Bunting.*

Sub Family ALAUDINÆ.—*Larks.*

Genus ALAUDA, L.—*True Larks.*

There is great difficulty in making out the species of this genus from description (unless they are very minutely described both as to structure and colour), as they are all clothed in such similar plumage, and I do not feel confident that I am referring the species I have observed to their proper places, and therefore wish that my remarks may only be considered as an approximation to the truth, till the specimens have been examined and compared at home.

184.—*A. Gulgula*, Frankl.—Sykes' Cat.?

The only specimens I possess, of what I consider to be this bird, were shot on the Neilgherries, where they are very abundant. Colonel Sykes says this is the *chundoola* of India, but the bird which is so frequently caged and kept by natives under that name, answers more to the description of his '*A. Deva*'. One of my specimens differs slightly from the others in having the tail feathers more acuminated, a rather longer beak, and longer wing. This specimen agrees with the measurements of Colonel Sykes, viz. total length 6 $\frac{7}{10}$ inches ; tail 2 $\frac{3}{10}$ths ; wing of this 3 $\frac{8}{10}$ths. Of another specimen the tail is only 2 inches, and the wing 3$\frac{6}{10}$ths. In both the hind toe alone is $\frac{4}{10}$ths ; hind claw $\frac{7}{10}$ths ; nearly straight. Whether these differences are accidental or not, I shall not here attempt to determine. Irides brown. Chief food grasshoppers, tipulæ, and other insects.

185.—*A chendoola*, Frankl.—*A. Gulgula*, Sykes ?—*Aggun*, H.

I do not possess a specimen of this bird, but have seen and cursorily examined some living birds lately. The *Aggun* of India is very common in the Carnatic, and also in the Northern Circars, I believe, but is rarely, if at all, met with on the great table land of Southern India. Having neglected to obtain specimens whilst in the Carnatic, I cannot give my minute details regarding it. Its shade of plumage is less rufous and more grey than that of the last, or of the next species : the

central marks of the feathers also are not so dark, the shade of the plumage beneath is greyish or earthy rather than rufous white, and the chin is pure white. Its bill too is much thicker and stronger than that of the last. The *Aggun* is frequently caught when young, and caged for its song, which is said to be very sweet; it also imitates the notes of other birds, but not so well as the next species. As I have never seen the first species (No. 183), except on the Neilgherries, I think that this may perhaps be the *A. Gulgula* of Sykes' Cat., but again the fact of the *Aggun* not being observed by me on the table land, and being considered as unknown here by the natives, renders this improbable.

186.—*A. deva,* Sykes.—*A. Gulgala,* Frankl.—*Cherundool* or *Chundool,* H.

This well known species appears to answer pretty exactly to the description by Sykes of his '*A. Deva*'. I suspect it may turn out to be the *A. Gulgula* of Franklin, as it appears to be more generally spread over India than any of the others.

The *Cherundool* is found all over the peninsula, but is more common in the table land than below the ghauts. It differs from the two former species in its smaller size, and especially in the form of its crest; for whilst in the two last, the crest is composed of nearly all the feathers of the head, being slightly elongated, and all capable of erection; in this bird the crest is merely confined to a few of the feathers of the forehead, the centre feathers of which especially, are much elongated, and partially acuminated, and when raised form a very elegant pointed frontal crest, which is raised at will nearly upright, the feathers of the top of the head and occiput remaining perfectly smooth. The shades of its plumage are almost exactly similar to those of the first species, its bill, however, is much stronger in proportion. The *Cherundool* is very frequently caged in all parts of the country, and the bird is kept in darkness by several layers of cloth being wrapped round the cage, the custom being to wrap an additional covering round the cage every year. In this state it sings very sweetly, and learns to imitate most exactly the notes of various other birds, and animals even, such as the yelping of a dog, the mewing of a cat, &c. &c. It feeds on various insects, chiefly grasshoppers, and in default of this food on various grains and seeds. Irides brown. Length 6 inches; of wing 2 $\frac{4}{10}$ths; tail 2$\frac{2}{10}$ths; tarsus about 1 inch; hind toe alone $\frac{3}{10}$hs; claw $\frac{4}{10}$ to $\frac{5}{10}$ths.

187.—*A. Dukhunensis*, Sykes.—*Emberiza Baghaira*, Frankl. Cat.? *Baag-geyra Lark.*—*Latti ? Baghaira* or *Baghōda* of some *Shikarees*, H.—*Ortolan* of Europeans.—*Social Lark.*

This bird as described by Sykes, is most probably the *Emb. Baghaira* of Franklin's catalogue, but as the only description of the *Baag-geyra Lark* I have access to, is very brief, I cannot be certain. This bird appears on the table land of India in October. It associates in vast flocks, frequenting the bare grass downs, and is fond of damp spots, as at the edge of tanks, &c. It also frequents grain-fields, and almost always retires to them for shelter during the heat of the day, from whence it does not in general issue again till next morning. They are so numerous occasionally, that 4, 5 or 6 dozens are sometimes killed at a shot, and numbers are often netted in some parts of the country, as I learn from Mr. Elliot's notes. When in good condition it is highly esteemed for the table. The *social lark* does not breed in this part of India, and quits it for the north in March. Irides deep brown. Length $6\frac{1}{4}$ inches; of wing 4; tail $2\frac{2}{10}$ths; tarsus $\frac{9}{10}$ths; hind toe alone hardly $3\frac{3}{10}$ths; claw about the same.

GENUS MYRAFRA, Horsf.—*Thick billed Lark.*

188.—*M. phœnicura*, Frankl.—*Reytul*, H. of some; *Ageea*, H. of others.—*Red bellied lark.*

The *red bellied lark*, is found over all the peninsula, but is much more common in the Deccan, than below the ghauts. It frequents the open plains, preferring the barest spots, ploughed land, stubble fields and beds of nullahs. It sometimes, though rarely, perches on bushes. Its habits are much those of the *Larks*. It feeds chiefly on seeds of various kinds, also on insects occasionally. Its abrupt jerking flight has been already noticed by Colonel Sykes. It frequently ascends suddenly in the air by a few interrupted strokes of its wings, and uttering at the time a pleasant loud whistle-like note, sounding something like *Too whee*; it then descends with a sudden fall, changing its note to a low lark-like warbling; when close to the ground it again repeats this, and so on for several times. Irides brown; bill horny above, flesh coloured below; legs flesh coloured. Length 6 inches; wing $4\frac{2}{10}$ths; tail $2\frac{4}{10}$ths; tarsus $\frac{9}{10}$ths; hind toe alone $\frac{3}{10}$ths; claw the same, nearly straight; bill to front $\frac{5}{10}$ths; gape $\frac{7}{10}$ths.

189.—*M. Javanica?—Ageea,* H. of some, *Junglee Ageea* of others.—*Red winged Lark.*

As I have no description of *M. Javanica*, I merely refer my bird to that species at a venture, but think, as it is mentioned in Franklin's catalogue, it is probably the same. I have only observed this species among stony and bushy hills, and low jungly plains in the northern part of the Deccan. It is never found on the bare plains like the last. It is found single or in pairs, is a wary bird when roused, flying a short distance, and seating itself behind a bush on the ground, or perching on the back part of the bush, which it does much more frequently than the last. Feeds on various seeds. I add a brief description. Above of a reddish brown or fawn colour, of various intensity; the feathers centred darker, and edged with lighter. Feather of head elongated, bright rufous fawn; centred with brown; quill feathers cinnamon rufous, tipped with dusky, tail brown, centre and external feathers edged with rufous. Beneath white, breast spotted with brown. Irides dark brown. Length $5\frac{1}{2}$ inches; of wing $3\frac{2}{10}$ths; tail 2; tarsus $\frac{8\frac{1}{2}}{10}$ths; hind claw alone $\frac{3}{10}$ths, longer than its toe; bill at front $\frac{4}{10}$ths; to gape $\frac{5}{10}$ths.

Genus AGRODOMA, Swains.—Anthus, Auct.—*Tit Lark.*

190.—*A. agilis.—Anthus agilis,* Sykes.—*Roogail,* H.—*Common Tit lark of India.*

Although by no means certain that this is the '*A. agilis*' of Sykes, yet as it is the most common species in India, I have ventured to consider it as such, adding a brief description for the sake of comparison. The *Roogail* is tolerably common over all India, frequenting the open grass downs, stony plains, and also not unfrequently the beds of rivers, tanks and other moist places. It runs swiftly along the ground, and when raised takes but a short flight. It feeds chiefly on various insects. It probably represents the *A. pratensis* of Europe, to which it appears to have a very close resemblance, but Colonel Sykes has pronounced them distinct.

Descr.—Above light olive brown, the feathers centred with a darker shade; beneath of a reddish or earthy white; the breast striated with brown lines; and a narrow line of same colour down each side of the throat.

My specimens vary in size from $6\frac{1}{4}$ to $6\frac{3}{4}$ inches; wing $3\frac{5}{10}$ths; tail

$2\frac{1}{2}$; tarsus $1\frac{1}{10}$th; hind toe alone $\frac{4}{10}$ths; do. claw (slightly curved), nearly $\frac{5}{10}$ths; bill to front $\frac{4\frac{1}{2}}{10}$ths; at gape $\frac{7}{10}$ths. Irides brown; legs flesh coloured. I have one specimen not differing in colour, the wing of which is only $3\frac{2}{10}$ths; hind claw perfectly straight, and the hind toe only about $\frac{3}{10}$ths of an inch. Is this a mere variety?

191.—*A. rufescens.*—*Anth. rufescens,* Auct.?—*Hill Titlark.*

This bird which approaches very closely the descriptions of the *A. rufescens* of Europe, I have hitherto found only on the grassy hills of the Neilgherries, where it is tolerably common. It runs briskly along the ground, and flies only a short distance. On one or two occasions, I observed it perch on a tree. I found its food to consist of various insects.

Descr.—Above of an olive yellow; the feathers centred with dark brown; beneath and superciliary mark of a light rufous tinge, darkest on the breast, which as well as the sides and belly are streaked with brown. Length $6\frac{4}{10}$th inches; wing $3\frac{2}{10}$ths; tail $2\frac{1}{2}$; tarsus nearly 1; hind toe alone nearly $\frac{5}{10}$ths; do. claw $\frac{4}{10}$ths, fully curved; bill shorter and stronger than in the other species. Length to front $\frac{4}{10}$ths; at gape $\frac{6}{10}$ths.

192—*A. rufula.*—*Anth. rufulus,* Vieill. Ency. Meth. p. 326.?—*Chilloo,* H.—*Pale* or *rufous Titlark.*

As the description of the *Anthus rufulus* of French authors, appears somewhat to coincide with my specimens, I have for the present considered them as the same. The *Chilloo* of *Shikarees* is tolerably common on the bare stony plains of the table land; I am not aware if it is also an inhabitant of the Carnatic. It has similar habits to others of the genus.

Descr.—Above of a pale rufous grey tint; the feathers centred with dusky, most distinctly on the head, hardly at all on the back and rump, beneath and superciliary stripe, pale fawn colour, whitening towards the vent and on the chin; breast very faintly marked with pale brown streaks; a brown stripe runs from the gape below the ear, and another from the lower edge of the under mandible, down the throat on either side. The wing coverts are brown, very broadly edged with fawn colour. The two centre feathers of the tail are also brown, edged with fawn, the external nearly all of that colour, the next to it tipped and edged only, and the remainder all deep brown. Irides brown; bill

horny above, pale fleshy below; legs flesh coloured. Length nearly 7 inches; wing $3\frac{6}{10}$ths; tail about 3; tarsus 1; hind toe alone $\frac{3}{10}$ths; hind claw rather more than $\frac{3}{10}$ths; more curved than in *A. agilis*; bill to front $\frac{5}{10}$ths; at gape $\frac{7\frac{1}{2}}{10}$ths.

193.—*A. similis.*—New species?—*Large Titlark.*

Descr.—The description of the last species will apply exactly to this very similar bird, with this exception, that the centre markings of the feathers are still more indistinct in this one; and that the fawn colour of the plumage beneath, extends over all the abdomen, vent, and under tail coverts. It differs, however, remarkably in size and in some points of structure. Length $8\frac{1}{4}$ inches; wing $3\frac{8}{10}$ths; tail $3\frac{6}{10}$ths; tarsus $1\frac{1}{10}$th; hind toe alone $\frac{4}{10}$ths; hind claw $\frac{4}{10}$ths; more curved than in *A. rufula.* Bill at front $\frac{6}{10}$ths; at gape $\frac{9}{10}$th. Besides the structural differences shewn in these measurements, this differs from the last in the bill being slightly curved, both at the culmen and commissure. Irides brown; legs flesh coloured. I only once observed this large *Titlark* in an open stony plain, there were a pair of them together, and I noticed that their flight was performed somewhat differently to that of the *Titlarks* in general, there being a more frequent flapping of the wings. I found fragments of insects in the specimen I then procured.

Genus MEGALURUS, Horsf.

193.—bis.—*M. ruficeps*, Sykes.

I have not hitherto observed this species.

Sub Family PYRRHULINÆ, Swains.

Gen. PYRRHULAUDA.—*Finchlark.*

194.—*P. cruciger.*—*Fringilla cruciger*, Temm. P. C. 260-1.—*Alauda Gingica*, and *Duree Finch*, Lath.—*Emberiza Gingica*, Gmel.—*Decora*, H. *vulgo.*—*Dubhuk Choree* i. e. *Squat Sparrow.*—*Black bellied Finch-lark*, or *Squat Finch-Ortolan* of some Europeans.

This curious little bird is extremely common in all parts of India, frequenting the open plains and cultivated grounds, and common on roads or any other bare spots of ground. Its habits are quite those of a *lark*. It is still more remarkable than the *Mirafra phœnicura*, for the sudden ascents and descents of its flight, mounting up some height by a few flappings of its wings, and then descending almost perpendicularly till close to the ground, when it again rises as before, and repeats this several times. In general, it takes but a short flight, and on alighting, squats so close that, as Colonel Sykes remarks " it almost allows itself to be ridden over ere it rises." It occasionally may be seen seated on a house top, but I never saw it perch except on one occasion, when I observed some 12 or 15 of them perched on a low tree close to a house in cantonment. This was during the height of the hot weather. I was fortunate enough to obtain the nest and eggs of this bird very lately (in February). The nest is composed of woven thread, mingled with some fibres of grass, and one or two small fragments of cloth. The sides are hardly raised at all, it was placed in a slight hollow on the open plain near a river, and contained two eggs of a slight greenish grey tint, spotted with brown, chiefly at the larger end. Length $4\frac{3}{4}$ inches; wing 3; tail $1\frac{6}{10}$ths; tarsus $\frac{6}{10}$ths; hind toe and claw $\frac{4}{10}$ths; bill to front $\frac{3}{10}$ths; at gape $\frac{4}{10}$ths. Irides reddish brown; bill flesh coloured, with a tinge of horny; legs flesh coloured.

Genus HÆMORHOUS, Swains.

195.—*H.* ? *roseus*—*Coccothraustes rosea*, Vieill. Encly. Meth. p. 1010. *Ois. Chant*, pl. 65.—*Fringilla rodcpepla*, Vigors? Gould's Cent. Him. Birds.—*Loxia Madagascariensis*, and *Lox. Totta* of English authors. *Tootee*, H.—*Rose Finch.*

I am not quite certain if the *Rose Finch* of India belongs to Swainson's genus *Hæmorhous* or not, but as far as I can make out, it appears to do so. It appears to be the species named as above by Vieillot, and if so, the name of *F. rodopepla* must sink to a synonym. The *Tootee* of India arrives in this country from the north, about November, and remains till March. I first saw it in thick jungle at the bottom of the Conoor pass, busily engaged in eating the seeds of the lofty bamboos there. I have seen it also several times in large groves of trees in the northern part of the table land. It associates in flocks of various numbers,

and devours various grains, especially *Jowaree* (*Andropogon Sorghum*), and also rice, and in default of these, various other grains, seeds and even flower buds, and young leaves of trees. It is occasionally caught and domesticated on account of its song, which is said to be very sweet. Vieillot says "it is often brought from India alive, and bears the climate well." It is said not to be bred in any part of India. Irides brown; bill and legs pale brown. Length $6\frac{1}{2}$ inches; wing $3\frac{3}{10}$ths; tail $2\frac{1}{4}$; tarsus not quite $\frac{8}{10}$ths.

Family BUCERIDÆ.—*Horn bills.*

Genus BUCEROS.—*Horn bill Toucan* of residents in India.

196.—*B. Cavatus,* Shaw.—Gould's Cent. Him. Birds.—*Garuda* of the natives of the forests.—*Malah-moraykey,* Mal.—*Largest Horn bill.*

I have not myself been fortunate enough to procure a specimen of this *large Hornbill,* but have seen it on several occasions in the thick jungles of Malabar, and in the Coonoor pass of the Neilgherries. I take the following account of it from Mr. Elliot's notes, who met it in the Soonda jungles.

Descr.—"Back, wings, belly, chin and bar on the tail black; neck, tail, thigh, wing spot, tips of scapulars and remiges white; bill vermilion above, passing into yellow, the lower mandible whitish, at the base black. The male bird has the space between the prominence and the true beak in front also blackish, from which a black stripe runs down the crest of the beak, towards the point, and the posterior termination of the prominence is also dusky in the male, red in the female." Length—male upwards of 4 feet; female 4 feet; weight of the latter $6\frac{1}{2}$ lbs; bill from point to gape in a straight line 10 inches; from point to end of protuberance $13\frac{1}{4}$ inches; protuberance $7\frac{1}{2}$ inches long; $3\frac{1}{4}$ broad.

"At the root of the tail of this bird on upper side, immediately above the vent, is a small sac, in which is a bundle or pencil of short bristles, forming a brush, from which exudes a yellow oily secretion, with which the bird appears to dress the white wing spot; when first shot the yellow colour comes off the bill in considerable quantities, and the

only parts of the body besides, that are stained with this colour, are, the wing spot, rump, and the small crest on the back of the head; this latter but slightly. This yellow substance continued to exude from the brush, long after the specimen was prepared and dry. The *Garuda* is sacred to *Vishnoo*, among the inhabitants of the forests, as the *Brahminy Kite* is in the open country."

This *Hornbill* is very shy and difficult to approach. The noise of its wings when flying is very loud, and can be heard a long way off. The Malyalum name signifies, I am informed, "*That makes the jungles resound.*"

197.—*B. Malabaricus*, Gmel., Lath.—*B. Albirostris*, Shaw, Wagler. —*Dhanesa*, Sanscrit.—*Dhanchooree*, H.—*Ibba Hakee*, Can.

This *hornbill* is to be met with wherever there is lofty forest jungle, and of course is most plentiful on the Malabar coast, but even here it is far from being a common bird. It lives in parties of four, five, six or more, and lives on fruit and berries of different kinds. Length of one specimen from forehead to tip of tail 31 inches; of wing $13\frac{1}{4}$; tail 14; tarsus $2\frac{6}{10}$ths; of bill straight to gape $6\frac{1}{2}$ inches; of protuberance alone $6\frac{1}{2}$; from tip of bill straight to posterior angle of the protuberance $8\frac{1}{2}$ inches.

198.—*B. Gingianus*, Lath.—*B. Oxyurus*, Wagl.—*Chakrotra*, H.—*Common Grey Hornbill.*

This bird is spread all over the peninsula, frequenting not only jungles, but also not unfrequently large groves of trees and avenues (in the more wooded parts of the open country). Like the last, it is generally seen in small parties or sometimes single. I have generally found fruit in the stomach of this bird, but on one occasion I found some large insects, chiefly mantides. Length from forehead to tip of tail 22 inches; of wing 8; tail 10; tarsus 2; bill straight to gape 4 inches.

199—*B. Gingalensis*, Shaw.—*B. Pyrrhopygus*, Wagl.—*Kooldal Hakee*, Can.—*Jungle Grey Hornbill.*

I have hitherto only seen this species but once or twice, frequenting lofty jungles in the Malabar coast. I found its food to consist of various kinds of fruits and berries. Bill whitish yellow; total length 22 inches; wing $8\frac{1}{4}$; tail $8\frac{1}{2}$; tarsus $1\frac{8}{10}$ths; bill straight to gape $4\frac{1}{4}$; breadth at base $1\frac{2}{10}$ths.

(*To be continued.*)

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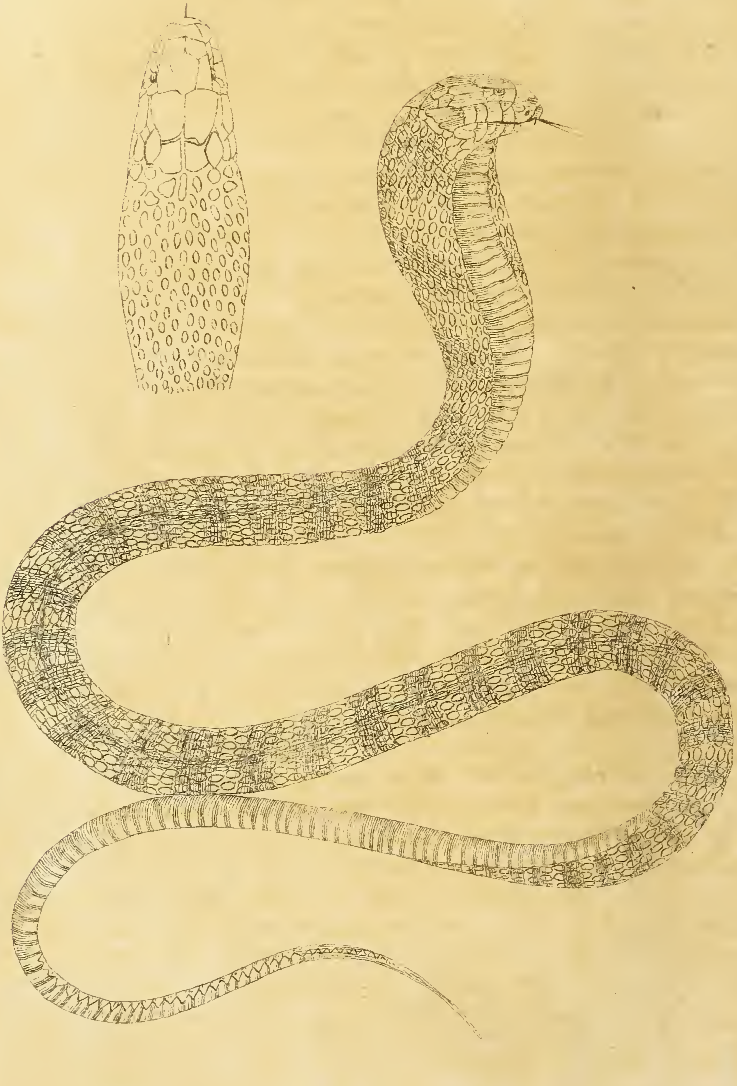

Naia Vittata

II.—*Description of a new species of Naga, or Cobra de Capello.*—By Walter Elliot, Esq.

In the beginning of January last, a fisherman from one of the Coopums near St. Thome, brought me a box, containing a snake which he said he had picked up, floating in the sea, a few days before, when fishing in his catamaram. The lid was fastened and on opening it, he was astonished to find a *nāg* snake. Perceiving it to be of unusual size, and to differ from the common kind in the distribution of the colours, I immediately bought it, and sent for a snake catcher, who took it out, and displayed it more fully to view. It appeared dull and languid, but was roused and expanded its hood. Its great length, the peculiar shape of the hood, or dilatation of the neck, and the circumstance of its being marked with numerous dark transverse bands, three of which extended across the enlarged portion of the neck, seemed to indicate it, as a species altogether different from the common sort.

It may be described in detail, as a species of cobra or naga, with the head scarcely broader than the neck, the crown depressed, and sloping to the muzzle, which is somewhat obtuse, and covered with 14 more conspicuous plates or laminæ. The first, forming the point of the nose, is semicircular, the next two between the nostrils are sub-triangular, the sides rounded; another pair succeeding these are broader and squarer. Between the eyes are three plates, larger than any of the preceding, sub-conical, the base of the centre one being placed anteriorly, those of the lateral ones posteriorly. The pair behind these are the largest of all, of an oblong shape, broader in front, and sloping from the middle of the exterior edge, to the posterior end: these are succeeded by a smaller broad oval pair, at the lateral junction of which with the preceding pair, are two others, distant and divided, which are about the same size as the last, sub-triangular and rounded. The gape is large ; the teeth in the lower jaw sharp, reflex and moderately strong, those in the upper are smaller, and forming two rows along the palate ; the larger fangs had been removed. The eyes are small, situated under and about the centre of the inter-ocular laminæ. When the animal is at rest, the neck is slightly smaller than the head, but when roused, it is capable of dilatation, like that of the cobra de capello : but the enlargement, instead of being broader near the head and sloping as it recedes, as in that species, is broadest in the middle and slopes gradually to the head and to the trunk. It is quite destitute of the spectacle

mark, but is crossed by three of the transverse dark bands, characteristic of it as a distinct species.

The body is round, covered with oblong, oval scales, distinct, close, but not imbricate. The length 10 feet 1½ inch, of which the tail forms about two feet. The abdominal plates or scutæ are long and 236 in number, the sub-caudal scutellæ are about 84 (?) pairs. The colour above was a pale yellowish brown, with a strong bluish grey tinge on the upper parts of the body, marked with numerous broad dark bands, in number 64. The animal appeared to be languid and weak, as if about to change its skin; it did not eat, and a frog which had been put up with it in the box, hopped away unmolested. For this reason, the colours when in health may differ from those here stated. The accompanying sketch was made the first day I procured the animal, and I had no opportunity of comparing it carefully in detail; for, a few days afterwards, it died, during my absence at Guindy, and had begun to decompose before it was discovered to be dead. An indifferent preparation has been made of its skin.

The group of Naias, or Nagas, forms a subdivision of the genus *Vipera* of Daudin (who separated the poisonous serpents with insulated fangs from the Linneæn genus *Coluber*), in the Regné Animal of Cuvier, distinguished as having " the head furnished with plates and the anterior ribs susceptible of being raised up, and drawn forwards, so as to dilate that part of the trunk into a disc, more or less broad." But a German Naturalist, Fitzinger, has formed them into a separate genus under the name of Cobra.

The most celebrated species that have been described, are the *Coluber Naia* of Linné, or *Naiâ Tripudians* of Merrem, common both to India and South America, and the *Col. Haje* of Egypt, also described by Linné and Geoffroy. Both of these differ entirely from the present species. Of the Indian cobra, Russell* notices eleven varieties, varying only in circumstances of colour and in the presence or absence of the spectacle mark on the neck.

In Gmelin's edition of the Systema Naturæ, four varieties of the *Coluber Naia* are noticed on the authority of Laurentini,† a German writer of the last century, who seems to have borrowed them from Seba.

These are—1.	*Naia Fasciata*,	Seba, vol. II,	tab. 89.	f. 3.
2.	*N. Seamensis*,	ib.		f. 1. 2.
3.	*N. Maculata*,	ib.	tab. 90.	f. 2.
4.	*N. Brasiliensis*,	ib.	tab. 89.	f. 4.

* Indian serpents, p. 7. pl. 5, 6. Part i, and pl. 1. Part ii.

† Specimen Medicum exhibens Synopsis Reptilium emendatum, Auctore J. N. Laurentini; Vienna 1768.

the last of which is adopted as a new species, under the name of *N. Rufa.*

On referring to Seba's work in the Society's Library, the following notices of the *Naga* group are found in vol. ii. at plates 84, 89, 90, 94, 97. All of these have the spectacle mark on the dilatation of the neck, except No. 1, of plate 90, and No. 2 of pl. 97, which are called females, a supposition that has since been proved by Dr. Hunter to be erroneous, and that they are merely varieties of the *Col. Naia.* Two others with the spectacle mark No. 1 in pl. 85, and No. 4 in pl. 97, are said to want the faculty of distending the neck, or to possess it in a very slight degree.

Nos. 3 and 4 of pl. 89, resemble the present specimen in the circumstance of having the body marked by transverse bands, the former throughout its whole length (whence Laurentini's specific name of *fasciata*), and the latter for about ⅓rd of its length. But both have the spectacle mark on the neck distinctly represented, the latter of a more than usual complicated pattern. Seba's description of No. 3, is "Indian serpent with a spectacle mark, elegantly ringed."

"Its whole body, of a pale cinereous yellow, is encircled, from the head to the very end of the tail, with reddish brown rings, some of which are narrow, others broader. The order which the Creator has observed in disposing these rings is such, that three of the narrow rings are interposed between every two of the broad ones, a phenomenon certainly most worthy of remark."*

But no such arrangement is observable in the present species, and this, together with the absence of the spectacle mark, and more especially its great size, which could not have failed to have been noticed, seems to establish it a new species: in which event it might with propriety be named *Naia Vittata*, the term *fasciata* having already been appropriated to another, though an unascertained species.

* Num. 3. *Serpens, Indicus, cum Conspicillo, lepidè circulatus.*

Totum hujus corpus, ex cinereo dilutè flavum, tenuibus, partim & latiusculis, annulis, fusco-rubris, à capite ad caudam usque ultimam ambitur. Ordo, quem summus rerum Conditor in digerendis hisce annulis observavit, talis est, ut bini annuli, latiores, tres semper alios tenuiores intercipiant, phoenomeno certè animadversione dignissimo. Seba Thes. ii. p. 95.

III.—*A cursory Notice of the Gold Tract in the Kupputgode range—Manganese Mines near Wodoorti—and Flint excavations in the Southern Mahratta Country—the Corundum Pits of the western part of Mysore, and the Diamond Mines of Kurnool.—By Lieut.* T. J. Newbold, 23*d Light Infantry.*

Gold tract in the Kupputgode range.—Passing recently through the Southern Mahratta Country, I was informed at D. rwar by Mr. Pelly, Assistant Collector, and by Trimulrow, a brahmin youth, whose acquirements, and thirst after knowledge, do infinite credit to the tuition of the talented president of the Bombay Branch of the Royal Asiatic Society—the Rev. Dr. Wilson—that gold had been lately discovered in the Kupputgode range, near the eastern frontier. I determined on visiting the spot, more especially as my intelligent friend Trimulrow, who has the merit of having first brought to the notice of Government the existence of gold in the particular locality of Doni, had not been able to witness personally the actual extraction of the gold from the sands of the rivulet, whence the specimens of the metal were brought him. Doni, I found to be a small village, about two or three miles south of the fort of Dummul, situated on the right bank of the rivulet, in whose sands the gold is found, immediately opposite. Although the *jalgars* (gold washers), were not at work, in consequence of the rivulets not having been lately flooded, I caused some of the natives on the spot to wash two or three baskets of the sand in my presence; and, after about five minutes labour, succeeded in obtaining five or six particles of gold dust. The process of washing has been often described, and does not differ much from that I have seen practised by the Chinese gold washers at the foot of mount Ophir, exchanging the conical vessel for a hollowed board: after the lighter particles of the sand are washed off, the gold dust remains mingled with a heavy black sand (No. 1), most of the particles of which are strongly affected by the magnet, and which does not differ from the granular magnetic iron ore of mineralogists: others are feebly magnetic; these, from their behaviour with fluxes before the blow-pipe, and their gunpowder-like appearance, I take to be menachanite (No. 2), probably derived from the decomposition of the dykes of basaltic trap, or the greenstone and hornblende rocks in the vicinity.

Along with the menachanite, and among the sand in which the gold was found, occur comminuted fragments of fibrous malachite; one (No. 3) a little larger than the rest, contained an irregularly shaped fragment of native copper; which, from its dark rough surface, I thought at first was hematite, but, in endeavouring to break it with a smart blow

of the hammer, I completely flattened it. A few small scattered grains of a greyish white metal occur, but are very rare: one of these has a slightly yellowish tinge, resembling the argentiferous gold, or rather auriferous silver, of Norway. The largest of these metallic substances (No. 4), a flattened water-worn button about half the size of a pea, having a purplish black enduit, on being submitted to re-agents, proved to be almost entirely composed of silver. I should have been inclined to suppose this fragment, from the scarcity of this metal in the rocks of India, to have been adventitious; had not I discovered a grey silver ore (No. 5), in a fragment of quartz shortly afterwards. It is by no means improbable that some of the smaller, flattish, grey, metallic looking grains may prove to be platinum, a metal which is often associated with gold.

The pebbles and sand, composing the bed of the rivulet, are derived from the Kupputgode hills, which form the sides of the valley through which the stream runs, and among which it has its rise, and are mingled with both fragments of kunkar and hematitic iron ore. The sand is composed chiefly of particles of quartz, variously coloured, comminuted garnet, and the metallic sands first mentioned. The surrounding formation is gneiss, with its associated schist of mica, hornblende, and greenstone, chloritic and clay slates; passing, in their upper portions, into silicious and ferrugenous schist, with beds of a lateritic rock. Near the base, between Guddak and Dummul, I found thin veins of a white, sub-crystalline marble in the greenstone slate. The whole of these rocks are penetrated by, and appear to owe their elevation to, large dykes of basaltic trap. Granite, too, is seen at no great distance in the plain to the south of the chain.

In tracing the gold dust to its matrix it will be useful to recollect, that where these plutonic rocks come in contact with the primary schists, a greater tendency to metallic and silicious developement is almost invariably observed, and it is in veins of quartz, ferrugenous quartz, and their alluvium, that we find gold to exist in the greatest abundance, from the Himálayas to Cape Comorin, in the Malayan peninsula, Borneo, Sumatra, Assam, the Birman empire, Hungary, and both Americas. On the peninsula of India, I have only heard of one exception to this rule, which is said to occur in the Madura district; where, according to Sir Whitelaw Ainslie (Mat. Med. vol. i. p. 514), gold was discovered by the late Mr. Mainwaring, mineralized by means of zinc, constituting a blende which, he thought, resembled somewhat the Schemnitz blende of Hungary. The gold washings, and mines of Mysore, near the Baterine hills, discovered by Captain Warren, those

around the base of the Neilgherri and Koondah mountains, in Wynaad and other districts of Malabar, all exist in primary formations, and associated with silica and iron, either in an integral state, or in the form of alluvial beds, clay, or sands. The richest gold mines of the eastern islands, as I have before stated, are found in similar geognostic situations, along the edges of the great volcanic belt that passes through the Indian Archipelago—a fact deserving of notice.

I was informed by the natives of Doni, that gold is found in greater abundance in the bed of the rivulet of Sottoor, a few miles from Doni, in the same range of hills, and I discovered it previous to my visit to Doni, in the sands of the Hurti rivulet, in the same range a few miles to the south of Guddak. The sands of both these rivulets are washed for the gold by the *jalgars*. It exists likewise, I was told by an old Hindu inhabitant of Savanur, in the Kor taluk of the Darwar collectorate, near Chick Mulgoond. In 1837, while passing through the western part of Mysore, I found a few grains of it, in the bed of a rivulet, near Gram, at the base of the Belladaira hill. These auriferous rivulets should be traced to their sources, which cannot be far distant, the sand carefully examined at every 40 or 50 yards, and the spot, where the particles of gold no longer appear, most diligently explored, the subjacent rock laid bare, and, if necessary, an excavation made into it.

I hardly need remark that the natives are perfectly acquainted with the art of purifying the gold dust by amalgamation, and that of refining it by means of repeated exposure to heat *below fusion*, with a mixture of muriate of soda and cow-dung ashes, the last of which is sometimes replaced by the powder of an *old* brick, mixed with a little borax. In simply melting gold, borax is added to assist its fusion. In the native process of amalgamation, a considerable loss is sustained from ignorance of the method for condensing and collecting the mercury, which is suffered to escape by volatilization. The existence of gold and manganese, in the Kupputgode hills, appears to have escaped the notice of that excellent observer Christie, and also of Marshall, and Colonel Sykes, the statistical reporter of this part of the Deccan.

Manganese Mines near Wodoorti, Kupputgode range.—At the time of my visiting the Kupputgode range, I had not seen Dr. Wilson's remarks on the minerals sent to the Museum at Bombay, by Trimulrow; from whose oral account, and from what he had heard among the hills, I was led to imagine the possible existence of coal among them; and, indeed, on my arrival, most of the natives concurred in assuring me that, there was a black stone to be found near Wodoorti,

called charcoal stone (*kolsah ka putther*), which Hyder and Tippoo had made especial search for. Led by this hope, though the nature of the formation over which I had already passed excited strong suspicions against the truth of the report, I crossed the hills by a steep and rugged path to Wodoorti, a village in a jungly valley, on the opposite side. About two or three miles hence, in a sort of defile that intersects the course of the chain on the north of the valley, at nearly right angles, I was conducted to a few half choked up excavations, at the bases of some large detached masses of a dark coloured rock, externally ferruginous and rugged; internally of a bluish black hue, tough and powdery under the hammer; and some parts, when struck, emitting a sulphurous odour. It contains numerous veins and nests of a shining foliated mineral of an iron grey colour (No. 5). Some of the cavities contained a white felspathic powder, others were coated with small stalactitic and botryoidal incrustations of the black mineral. Before the blow-pipe, per se, it fuses partially at the edges, with slight gaseous extrication, leaving a shining bluish black slag. In the yellow or oxidizing flame, it gives out a slight sulphurous odour, and the slag is affected by the magnet. With borax, on charcoal, it fuses with slight ebullition into an amethystine glass; and, with carbonate of soda on platina foil, into a light bluish green glass. When powdered, and treated with muriatic acid, the extrication of the peculiar fumes of chlorine sufficiently attest the presence of manganese. I was unable to detect the existence of plumbago by exposure to a deflagrating heat with nitrate of potash. Hence the mineral would appear to be the black oxide of manganese in combination with iron, and probably a little sulphur and alumina.

Sir Whitelaw Ainslie (Mat. Med. vol. i. p. 538), states that this metal,—so useful in the arts in Europe, in the composition of the finest kinds of crystal and flint glass, and common bottle glass; imparting a beautiful amethystine or red hue to glass, in yielding the rich brown tint used for painting porcelain, in bleaching, and in the preparation of chlorine gas,—is not common in India. He mentions that Captain Arthur found it in Mysore. Since his time however, it has been discovered by Colonel Cullen and Dr. Benza on the Neilgherries, by Major Burney in Ava,—and occurs associated with iron on the Himálayas. I have found it, also, in combination with oxide of iron, in veins in the laterite composing the cliffs at Bedar, in the Nizam's territories, near the line of contact with the trap on which the laterite there rests; in the sandstone of the Southern Mahratta Country, between Kulladghee and the falls of the Gutpurba

near Gokauk; and in the primary schists of Sondur, and the copper mountain range, in the Ceded Districts. The formation of the Kupputgode range, near the manganese excavations of Wodoorti, is similar to that of Doni, previously described.

Flint pits.—About two miles southerly from the manganese locality, some excavations were pointed out to me in the plain, near the base of the opposite range, whence Hyder and Tippo used to supply their troops in this part of the country with flints. They are of a yellowish brown colour, translucent at the edges, tough, of a jaspery nature, and answer the purpose, it is said, extremely well. There is still an abundant supply.

The Corundum mines near Gram in Mysore.—The Corundum mines of Golhushully and Kulkairi, lie about seven or eight miles east by north from the fort of Gram. They occur in a bed of talcose slate, associated with mica slate, gneiss, and protogine; and consist of a series of excavations dug in the plain, varying from two to twelve feet in depth. The corundum is generally found in a gangue composed of white and greenish earth, arising from the decomposition of the adjacent rocks, and associated with ferruginous quartz, a poor brown iron ore, ferruginous earth, chert, a reddish jasper, schorl and felspar. In one of the excavations, I found a fragment of rock salt, and many of the wells in the vicinity are brackish The corundum often occurs in amorphous fragments, from the size of a pin's head to that of a turkey's egg. It is not unfrequently seen in hexagonal prisms, tapering slightly to one end. The colour varies from whitish to grey, reddish, and hair-brown. The pieces of corundum are thrown out, cleared and separated by the miners into four classes, viz. the reddish brown, the white, the chips of both, and the refuse. The three first form the articles of commerce; which, according to my native informants, are sent down the ghauts to the ports of Mangalore and Tellicherry; and there sold by the contractors to the Bombay and Arab merchants, at prices from 12 and 15 to 30 rupees the candy, according to quality. The natives on the spot, in 1837, told me that the mines had not been opened until within the last 8 years, and that the corundum is also found at Burkunhully, Kundeo, and Yedgunkul, in the Chinraipatam division: at Norhik in that of Narsipur, at Deysani Curbonhully, in that of Bannawar, at Appianhully, Beygoor, Bunnercota, Mundium and Permuty in Mysore; near Guzehutty

and Chennimully in Coimbatore, near the Tapoor ghaut, in Salem, and also in Cuttack.

Diamond Mines of Ramulacota in Kurnool.—These mines are situated in the Kurnool territory, about 21 miles south of the city of Kurnool, in the lower part of a large basin-shaped plain, almost surrounded by low hills of sandstone, grit, breccia and puddingstone, associated with the limestone of Cuddapah. The present excavations occupy but a circumscribed area, of about 1,000 square yards, and are dug in the alluvial soil at the base of the hills. Remains of old and extensive mines appear in a low adjacent ridge, composed of a dark ferruginous grit and conglomerate, and the rock has all the appearance of having been blasted by gunpowder. Diamonds of a very fine quality are said to exist in this conglomerate, but as they are few, and the labour of excavating and blasting the rock great and uncertain, the rock has been quitted for the alluvial soil; where, though the diamonds are of an inferior quality, they are more numerous, and attained with greater facility; and, with the most common tools, by ordinary native labourers.

The diamond pits, though not occupying so large a space of ground are deeper and far more extensive than the celebrated mines in the vicinity of Cuddapah, at Chinnoor, Avalumpully and Condahpetta. The excavations in the rock resemble those at Banaganpully, and at Muni Mudgoo, north of Gooty. The geognostic position, the alluvial stratum of water-worn pebbles and sand, in which the majority of the gems occur,—the chert, quartz, and jasper pebbles composing the puddingstone and breccia, cemented by a dark ferruginous sandstone, —the vicinity of granite and dykes of basaltic greenstone, present the conditions under which I have usually seen this gem appear in the peninsula. Kunkar is seen, but sparingly. The diamonds which I saw at Ramulacota, were of an inferior size, and but few crystallized in the octohedral form. They had severally the white, grey, yellow and greenish tints; but it is said those that occur in the conglomerate, and in a spot close to this rock, are generally of a superior description, with a fine roseate tinge. The process of mining and washing, resembles what I have before described, in speaking of the Cuddapah mines. There were about 20 natives engaged in washing the alluvium when I visited the spot, and while I was looking on a small fragment of diamond was discovered, which was regarded as a propitious omen. In the dry season, 500 labourers are usually at work, who pay generally a certain sum to the contractors. The latter I was informed, rented the whole of the mines from the Nabob of Kurnool, for about 750

rupees per annum. The usual hire of a labourer on the spot is, I believe, 4 pice and a meal of rice per diem. The opening of a new mine in the dry season presents an animated scene, and was sometimes honoured by the presence of the Kurnool Nabobs.

Diamond mines formerly were worked in the Kurnool territory, at Saitancota, Deonoor, and Tandrapaud. They are cut and polished by the jewellers of Muni Mudgoo, who have been long famous for their skill in polishing diamonds, and were formerly sent for sale to the metropolis of Golconda, and subsequent to its fall, to that of Hydrabad.

I have the pleasure to present to the Society a model of a diamond polishing machine, used at Muni Mudgoo, and constructed for me there by one of the polishers. The use of diamond dust in the process of polishing is thoroughly understood by the natives, and in splitting the larger gems they take advantage of the planes of cleavage.

Examination of the specimens of Minerals alluded to in the foregoing paper.—By Lieutenant J. Braddock.

No. 1.—*Gold dust, found in black magnetic sand.*—The grains of gold, though few, being large enough to form a judgment on, need not to have been tested; but, on testing them, after solution in nitro-muriatic acid, no doubt existed of their being gold.

No. 2. *Menachanite ?*—Feebly magnetic; in small grains, somewhat like coarse gunpowder. External appearance agrees to the description given of menachanite in Ure's Chemical Dictionary. It was examined as follows.

Blow-pipe.—With borax on charcoal, fused into a green glass. Fused with pure potash on platina foil, and treated with muriatic acid at a boiling heat, the powdered substance was partly soluble, leaving a dark brown residue. The muriatic solution was milky yellow, which, when tested, gave the following indications :—

Tincture of galls—Reddish brown colour.

Oxalic acid—No immediate effect: next day a small whitish precipitate.

Ammonia—Copious dirty brown precipitate: next day clear reddish brown solution, with darker precipitate.

Hydrosulphuret of Ammonia—An immediate deep greenish black, changing almost instantly on the surface to white, and passing afterwards into a dirty yellowish brown, which was ultimately precipitated.

On selecting by means of the magnet, a few grains more magnetic than the others, prussiate of potash, and tincture of galls, indicated the presence of iron. Two small grains, picked out from the other grains, proved to be silver. The mineral may possibly be menachanite, and may contain titanic acid, but the quantity was too small to be subjected to a sufficient examination.

3. *Malachite* ?—(and a button of metallic copper).

The proper tests gave distinctive indications, that copper was present in this mineral.

4. *Silver ?*—This specimen was a button or large globule ; it had a blackish purple tarnish ; had been flattened by the hammer. On trying its further ductility, it flattened under the hammer, and crumbled at the edges ; the crumbled portion had a granular appearance ; globule cuts like sliver ; white ; on beating in the diamond mortar, it flattened and was malleable.

The usual tests left no doubt of its being silver : it dissolved in nitric acid, and left only a little black powder as a residue.

5. *Grey silver ore ?*—Crushes easily ; frangible ; powder not at all the colour of the ore, but dark red lilac. The external characters of the ore approach near to the description in Ure's Dictionary, of the grey carbonate of silver and bismuthic silver. As the specimen was small, a piece about the size of a pea was examined, and gave the following indications :—

Reduced to powder and treated with nitric acid ; slight disengagement of nitrous gas : large portion undissolved.

A.—This acid solution gave on testing the proper indications of silver.

A.—This residue was treated with muriatic acid and heat : a part was insoluble, B.—The muriatic solution was tested and gave the following indications of antimony :—

Water—The solution turned milky.

Zinc—Black precipitate.

Hydrosulphuret of ammonia—An orange coloured precipitate.

B.—On this residue, muriatic acid and heat appeared to have no further action. Nitric acid was then added, and the mixture boiled. There was still an insoluble portion left. C.—This nitro-muriatic solution was examined as follows :—

Water—Produced opalescence (antimony).

Prussiate potash—Emerald green, changing to blue when precipitated.

Ammonia—White flocculent precipitate.

Hydrosulphurate of ammonia—Greenish, changing yellowish brown.

Tincture galls—No effect: next day settled into a flocculent brownish yellow precipitate.

Phosphate soda—Slight white flocculent precipitate.

Sulphate of iron—Slight dust-like precipitate.

Oxalic acid—*Muriate of tin*—no effect.

The precipitate C contained sulphur, which was burned off, leaving a black residuum, which by deflagrating with saltpetre, indicated the presence of carbon in some shape. The residuum after deflagration was washed, and 2 or 3 minute globules of silver collected; also another minute metallic globule, and a little silex, and earthy matter.

The small metallic globule was so minute that it required to be examined by the microscope, and admitted only of two tests being applied to it. The examination resulted as follows. Colour, dark iron grey; lustre, dull, metallic; streak, a lighter grey of dull lustre; malleable; harder than silver; insoluble in nitric, but soluble in nitro-muriatic acid:—this solution was tested with,

Hydrosulphuret of ammonia—Which gave a dark green colour, which turned into a black precipitate, leaving the solution tinged olive.

Prussiate of potash,—gave an emerald green colour.

I may here state that two minute metallic grains were picked out of the menachanite, No. 2, which proved as before stated to be silver; and a third grain soluble only in nitro-muriatic acid, which being tested as for platina, and compared with a solution of platina foil, gave indications as follows:—

	Metallic grain.	*Platina foil.*
Muriate of ammonia	no change	no change.
Old muriate of tin	dark brown passing to lilac.	yellowish brown.
Fresh made do.	lilac	lilac.
Prussiate potash	bluish green	lighter bluish green.

Tincture galls..............lightish brown...... .... darkish brown.

Query, whether the solution B, and the single globule from C, together with the last mentioned single grain picked out of No. 2, may be considered as indicative of platina ? The silver ore No. 5 may perhaps contain the following substances.—It was picked up in the same locality as No. 2, of the specimens mentioned in the foregoing paper.

Silver.
Antimony.
Sulphur.
Carbon, or some carburet.
Platina ? doubtful.
Silex.
Earthy matter.

No. 6. *Manganese* ?—slightly magnetic.

Blow-pipe—with borax, amethystine glass. Dissolved in muriatic acid with heat, evolving chlorine. The solution behaved as follows.

Prussiate Potash—Green grey precipitate.
Ammonia—Brown precipitate.
Carbonate Potash—do.

The powder was tried with nitre, but no deflagration occurred.

The specimens most interesting in the examination were the grey silver ore, and the small metallic grains; but all the specimens were so minute in quantity that only a first rate analyst could pronounce decidedly concerning the more difficult points. It would be desirable that the bed of the nullah and the hills immediately adjoining should be inspected more minutely: it might repay the mineralogist, if not in pocket, perhaps in the honour of new discoveries.—Captain Newbold was kind enough to assist me in these examinations.

IV.—*Journey of the Russian Mission from Orenbourg to Bokhara.—Translated by Colonel* MONTEITH, K. L. S., *Chief Engineer of the Madras Army.*

(*Continued from vol.* 10 *p.* 168.)

BOOK SECOND.

CHAPTER I.

Observations on the Khanats in the vicinity of Bokhara—the ruling race in Central Asia.

The Asiatic people to whom the Russians give the name of Tartars, have the nose slightly flattened, the cheek bones prominent, little beard on the chin, and small eyes, frequently with a cast in them. Gengis Khan, at the head of the Mongols, subjugated the Tartars, who became incorporated with his army, and those of his successors. As they were the most numerous, the conquerors adopted the Turkish language, barbarous as it was; from this mixture of Tartars and a race similar to the Mongols, sprang, I think, all those tribes regarded as Mongol Tartars: they ought to bear this name, which is appropriate to them, and which prevails in Turkistan.

What difference is there in fact between the features of a Kirghiz, an Ouzbek, a Turkoman, a Kezareh, an Eimah, and those of a Turk of Constantinople, or a Tartar of Kazan or Crimea *

Some modern geographers affirm, with but little foundation, I think that the Kirghiz possess the features of pure Tartars, which resemble those of Europeans; but it is impossible to confound the Kirghiz, and the other Mongol Tartars, with the Kalmoucks, since they do not possess the same corpulent frame, or features so strongly marked.

The Kalmoucks speak a different language, and have the Tartar features to the most exaggerated degree.

A part of the Kalmoucks who fled from the banks of the Volga, in 1770, were obliged to remain, or were captured by the Kirghiz; this has tended in some way to increase the strongly marked Tartar features, which are still met with among the Kirghiz.

Having on the road asked a man, who possessed completely the Mongol feature, if he was a Kalmak (that is what is called a Kalmouk),

* The author must speak of the Turkoman tribes in Asia Minor, for the Turks of Europe, by constant mixture with Europeans, have decidedly Greek features, full beards, and generally a fairer complexion than the people of the South of Europe.—*Translator.*

his companion began to smile. On enquiring what there was in the question to excite their mirth, I learned that the Torgout Kalmouk, having been reduced to a state of slavery among the Kirghiz, it was considered as a disgrace to have descended from them. I then understood what it was that had caused a smile at the expense of the Kirghiz, whom I had so unintentionally offended.

The boundary which is generally assigned to Tartary, does not appear to me correct: for, under this name, the country inhabited by the Tartars of Siberia, Kazan, Astracan, Crimea, and that which extends from the Belour mountains to the Caspian Sea; for the Turks of Constantinople ought to be included in the same race: in Dzoungarie in the little Kouldja, five hundred dwellings belong to the Doungani Tartars, who are the same race with those who occupy one thousand dwellings in the great Kouldja, and who all speak the Tartar and Mongol languages.

The Tartars, who dwell and reign in the country, erroneously called by us little Bokhara (a name unknown to any Asiatic, and for which I will henceforth substitute that of Chinese Turkistan), although subjugated by the Kalmouks, have nevertheless not become entirely extinct; they are, however, more of the Dzoungar Kalmouk, who passed into Chinese Turkistan, along with the Mandchous in 1759. Tartar is still the prevailing tongue in Cachghar, Jarkend, Khoten and Ak sou. These then are the countries which belong to Tartary in a literal sense.*

I do not coincide in the opinion of those who maintain that geographically, Tartary should be regarded as extending eastward, as far as the Belour mountains, and to the south-east as far as Hindoo Koosh, which there separates it from Afghanistan.

In this case, the race of Tartars, who never extended so far southward, would at the same time comprehend, under the denomination of Tartary, some countries which are not of Tartar origin, while it would exclude Chinese Turkistan, which is literally so. If in geography we give to a country the name of a people, it should be conditional on such people inhabiting that country.

It appears to me then, that Central Asia would be a more appropriate name to introduce in lieu of Tartary, since I have found it more correct, and more geographical.†

* I have seen many of these people who speak Tartar and not Mongol.—*Translator.*

† It is almost impossible to translate this chapter, which is obscure even in French, and is generally the case with the Count's style of writing, it not being his native tongue.—*Translator.*

Chapter II.

Central Asia—Division—Appearance—Mountains—Rivers and Streams—Sea of Aral—Marshes—Climate.

I consider Central Asia to be the country bounded by the Irtich, the Altai, the Tarbaghatai, the Moussart or Mous-tagh (ice mountains), the Belour (christal), the Hindoo Koosh, mountains of Ghaour, which bound the north of Persia, the eastern shore of the Caspian Sea, the Oural, and the northern boundary of the steppe of the Kirghiz.

Independent Tartary is applied to those states, which are still unsubjected; in which sense, they belong to political geography, but to preserve consistency in any description, I will adopt the name of Independent Mongol-Tartary.

The great table land, inhabited by the Mongols, may be called Mongolia, and to avoid confusion, I will adopt the names of great and little Tibet, Chinese Turkistan and Dzoungarie, or province of Ily, as the Chinese call it.

The regions of Asia, which I have either visited, or obtained certain information regarding, are, to the north, the countries of the Kirghiz; to the west, the Khanat of Khiva, the Cara-calpaks, the Aralians, or inhabitants of the banks of the Aral lake, and Turkomans; to the east, the Khanat of Khokhan (called Ferghana by the Arab authors), including the towns of Tachkend and Turkistan; to the south, Bokhara, the desert inhabited by Turkomans, the Khanats of Meimeneh, Ankoi Balk, Khoulm, Badakshan, Koulab, Hissar, Cherzabés (green city), the country inhabited by the Gillijes Afghans, or eastern Persians, the Kezareh, the nomade Chiites, Chgaanies, the Dervazeh Pagan nomades.

The elevation of the steppe of the Kirghiz is very low, by our observations, the barometer, during a constantly calm atmosphere, stood at 27 inches, seven and eight lines, the thermometer being at about 8 or 10 degrees of Remeur. The steppe, about the 52 degrees north latitude, as a fertile soil, producing forests of pines, birch, and good grass. To the south, the country is deficient in moisture, a few fir trees here and there met with in some spots of the Olou-tagh, a chain of mountains, which, generally speaking, only present valleys, devoid of vegetation, granite rocks, and mines of lead.

In the western parts of the deserts, that is to say, the route from Bokhara to Orenbourg, grass is only found near the mountains of Moughodjar. Beyond the Orsk it is not met with to within 250 verstes of

the Oural. Not a bush is met with in this space, so that caravans are obliged to carry fuel to cook or warm themselves. It is impossible to make use of cow-dung except in dry weather.

The greater part of the Kirghiz steppe, is composed of argillaceous plains, slightly undulating and covered with worm-wood, a few thorny plants, and on approaching the south, the bush called saksaoul.

This dreary waste includes some extensive sandy deserts, the largest of which is the Cara coum, bounded on the south by the Sir-deria, and the Bitipak which extends to the north and N. E. of Turkistan: having before described these deserts, it is unnecessary again to mention them; cultivated spots are to be met with, on the banks of the Sir-deria, and between the river Kouwan and the Djan-deria; they are also found near all the towns, for instance, near Turkistan, Tackhend, and others.

The country between the Sir and the Amou-deria, is occupied by the Kizil-coum, the soil on the northern and southern extremities is clay, with less admixture of sand than the steppe of the Khirghiz, but more arid, and consequently more barren.

Between the Caspian and the Sea of Aral, the soil is generally sandy, water is here procured from wells, said to be from six to nine toises, or fifty-four feet deep. A rocky chain of mountains called Kharaghoumbet, runs along the Sea of Aral, and from the banks of the Bay of Bourzouk, or Koul-Madjar, to the nearest point of the shores of the Caspian, the ground is covered with shells, apparently indicating an ancient junction of those seas.

The cultivated spots near the towns, or on the banks of rivers, are merely small patches, rendered fertile by means of irrigation, the greatest part of this region is a desert, inhabited solely by a small number of the wandering tribes.

The vast plains of Central Asia, are intersected by chains of mountains. In the midst of the steppe of the Kirghiz the group of Oloutagh rises above all the mountains of the desert; it terminates the Arghamat chain, running from east to west. Two ranges branching off from the Oural mountains, runs into the steppe, the one near Gouberlinsk, of which we have already spoken, the other near Akto. caraghai, passes to the north of Verko-ouralsk; this branch retains its name as far as the source of the Tousak; then it is greatly diminished in height, and takes the name of Dajabouk-caraghai, after which it again attains a great elevation near the source of the Soun-touk, it again sinks, takes the name of Karaadir-tagh, and joins one of the branches of the Moughodjar mountains.

The Karaadir-tagh mountains, extend to the east, as far as the Toupalak-tagh, a branch terminated by the heights of Teke-tourmaz and Kotour-tagh, near the Sari-tourghai. It is worthy of remark that not a single salt lake is to be met with in the western side of the Atkocaraghai, though there are several immediately on the east of this chain.

The Boukhan hills, to the south of the Kizil-coum, extend to the west, as far as the Amou-deria, near Khiva; they then form the chain of Vassil-cara, and are well known by that name,and perhaps close to the Amou-deria, they are the origin of the Djani-chir, or Lion's heart, a name which is found in Hadji Khalfa's Turkish geography, though actually unknown in Bokhara.

On the eastern side the Boukhan hills unite with the Koukertli, and apparently only a branch of the Alps, situated to the north of Samercand, as well as the whole mountainous country of Bukbouldouk, Sousiz-cara, Koultchouk, and Arslan-tagh, is a branch, which detaches itself from the Alpine country, lying to the north-east of Samercand, and probably between it and Djisagh. The southern ramification of this branch is terminated by the Noura-tagh (mountain of light), which is very high, we had a view of its summit from Caraghata, which in the month of December, was covered with snow, of which there was none on the plain. It will be hereafter shewn, that this mountain favourably affects the cultivation of the lands, between it and Bokhara.

The south eastern extremity of this table land, is the most elevated, and from the space between Khokhan, Nissar and Dervazeh, spring those mountains covered with eternal snows, of which I was unable to learn the names from any native of Bokhara; the highest of these chains lies to the north of Dervazeh, the next in height are those to the north of Khokhan, which in the first instance, extends along the road, leading to Kachghar, cross it near mount Terek, which is also almost constantly covered with snow, and then spread to the left of the road. Monsieur Nasarov, who was obliged to halt at Khokhan, and at Margakhaneh, in the year 1819, and who has since given an account of his journey, calls these mountains Kachghar-divani; they are joined by the Terek to the Ala-tagh, where the Sir-deria has its source. The Ala-tagh extends from Turkistan, Tackhend and Khokhan, to the frontiers of Dzoungarie, all the mountainous country is inhabited by tribes of Kirghiz of the great horde, called the black or savage. These mountains are call-

ed Ala-tagh, which means pie-bald form, some of the summits being constantly covered with snow, whilst others are brown and free from it.*

There is a very high mountain situated to the north of Ramit, a city to the east of Bokhara. This mountain joins the chain extending to the north of Iagnaou, and unites to those of Bokhara; then separating into a number of ramifications, the general direction of which I have attempted to lay down on the map, between Samercand and Chersabés (green city), there is a very elevated chain, which gradually diminish as they divide before reaching Carchi. In following the road to Ghoussar by Deïnaou, to Hissar, there is on the north side a very elevated chain of mountains, which become lower on approaching the Amou-deria. Hereafter I will describe the route followed by the caravans from Balkh to Caboul, a route, which if accurately kept, would throw much light on the topography of these countries. The two great rivers the Amou and Sir, water the countries through which we passed. The Amou only takes this name after the junction of the Zour-ab or Wahch, with the Badakhchan, two considerable streams, one coming from the north-east, the other south-east the Amou. These receive the Kafernihan (name of the infidels), the Toupalak; the Ghouloum majestically flows in a bed of from 200 to 300 toises broad, it then divides into two branches, and falls into the lake of Aral,after a course of nearly 1,400 verstes, or nearly 1000 miles. I do not imagine that the Mouhrab can reach the Amou, and it appears to be lost in the sandy desert through which it flows. It is certain that the river of Samercand called Kouwan, and also Zer-afchan, is lost in the Cara-koul lake, which has no apparent communication with the Amou-deria (Oxus), and is distant from it nearly 30 verstes.

Much discussion has taken place regarding the ancient mouth of the Oxus. Some geographers have supposed that the travellers of the 16th and 17th century, have less expressed what they have seen with their own eyes, than what they have endeavoured to reconcile with the frequently false geographical statements of Ptolemy, and even deny that the Oxus ever flowed into the Caspian, though Jenkinson, Bruce, Hanway, Beckevitch, all state that a branch of this river actually falls into the Caspian. It appears to me there is some credit due to these travellers, particularly as Monsieur Mouraviev,† a colonel in the Russian service, who went from the Balkan bay to Khiva in the year 1820, himself saw traces of the

* I think this is a mistake, Ala-tagh is literally high mountains, and a very just name for them, they divide China from Tartary.—*Translator.*

† I have generally seen his name spelt *Mouravieff,* now a general, and lately employed on a diplomatic mission to Constantinople.—*Translator.*

branch, mentioned by the before mentioned travellers. M. Mouraviev thinks the Amou, about 160 verstes north of Khiva, turned to the west, and divided into two branches before entering the bay of Balkan. However it is not Monsieur Mouraviev alone who has assured me of his having seen the ancient bed of the Oxus in many places between the Caspian and Khiva, in which bushes now grow: a Major of Cossaks and native of Khiva, who was a very well educated man, considered it would be easy to restore the ancient course to the Amou-deria, which he supposed was too notorious to be doubted. It is currently reported that this river was turned by the Khivians during the piracies,* of the Cossak Stenko-Razin, in 1670; but Jenkinson says in 1559. The Oxus formerly fell into the Balkan bay, but now does not reach so far, but flows into the lake of Kitai, or Aral; all the water in this country is procured by canals from the Oxus, which is the reason it no longer reaches the sea.

The general opinion at Khiva is that an earthquake, about 500 years ago, changed the course of the Amou-deria. This assertion has nothing impossible in it, as the countries of Khiva and Bokhara are very subject to these natural convulsions: it is therefore quite possible that the Oxus formerly divided into two branches north of Khiva, one falling into the Caspian, and the other into the Aral: this, if correct, will reconcile the conflicting opinions of geographers on this subject.

The upper Amou-deria, or Zour-ab, near Dervazeh, is about 40 toises broad, and exceedingly rapid, till its junction with the Karateghin. Gold dust is found in the sand; the banks are very high and precipitous, and the bed obstructed with rocks, over which the stream foams with great noise and force. We will leave to Mr. Elphinstone the task of describing its source, as I heard nothing regarding it, which could be depended on.

The Sir-deria which has a course of about 1200 verstes or 800 miles, only becomes considerable after its junction with the Akboura, which runs near to Tadj or Takht Suleiman, a mountain also called Och. Here its

* This river is expressly stated to have been turned by the Khivians, about the time of the Russian expidition under Prince Bekevitch, in the reign of Peter the Great. The troops were massacred or made slaves by the Usbecks; from which time, the Russians have constantly had in view the conquest or punishment of this state. I fully coincide with those who assert that the Oxus once fell into the Caspian; at least its principal branch. An intimate friend of mine, Budeh Beg, who was in the service of Persia, and subsequently entered that of the Khan of Khiva, considered it a point beyond dispute, and asserted that, in high freshes, a part still look that direction. Should Russia occupy permanently that position, Khiva, I believe there will be no doubt of the Oxus being again restored to its ancient bed, which will throw the whole of Tartary open to any enterprize of hers, either warlike or mercantile.—*Translator.*

valley enlarges, and the stream becomes more rapid. Its source is hid in the mountains of Belour and Ala-tagh. None of the travellers who annually go from Khokhan to Kachghar, could give me the least information on the subject. Many streams fall into the Sir between Khokhan and Kodjend ; near the last city it is larger than at its mouth, in the Aral; the sandy deserts through which it flows absorbing a great quantity of its waters. About 350 verstes from its mouth the Kouwan separates from it ; this last then divides into five channels, which again unite, and form a number of lakes called Aralu-koullar, near which the country is fertile and well cultivated. Before the Sir enters the lake of Aral, it again unites with what remains of the Kouwan. Higher up it also receives a small stream from it, when the river is full at the melting of the snow. This branch certainly offers facilities for irrigation. The people who reside on the river assured me both the Amou and Sir are fordable at several points ; but I have never seen any person who had actually crossed in this way.

They have recourse to different methods for crossing these rivers. I passed the Sir in a row boat ; M. Nasarov crossed it near Khokhan in a boat drawn by horses, swiming across. Another and rather a singular method was told me ; the traveller's clothes are put into two leather bags,* which are afterwards filled with air, and on which he takes his seat; they are then tied to the tail of a horse, which swims across the river ; the traveller being bouyed up by the inflated bags. From what I was told in Bokhara, I am inclined to think the Amou-deria is passed in the same manner. I was assured that people who cannot swim lie down on one of these inflated bags, and paddle themselves along, with one hand without any danger ; as for the Kirghis their skill in swimming is of little use to them, as they always hold fast their horse's mane with the right hand, swim with the left, and thus cross from one bank to the other of the Sir.

The Irghiz and the Tourghai, the junction of which I witnessed in the Tonghouz-khan, are inconsiderable rivers ; in many places they are almost dry. They form the lakes of Aksakal, extending to the north-east, and the most westerly of which is separated from the sea of Aral by chains of clayey hills, in the midst of sandy deserts, making it very unlikely any subterranean communication should exist between them : the distance is 130 verstes. The names of Taraz and of the Talaz are at present unknown.

The sea of Aral, called by the eastern nations Ourghentch, is sur-

* This is common on the Tigris and Euphrates also.—*Translator.*

rounded on the east and north-west by sandy hillocks and clayey plains; on the north-east the banks are twenty or thirty toises above the water; on the north-west are the bay and lakes of Koulmaghour. Near them are to be seen the remains of an ancient fortress, a well of fresh water, and the traces of the ancient bed of the sea, extending a considerable distance on this side. On the west of the Aral is the chain of Karaghoumbet hills, very steep on the side next the sea, but with a gentle slope on the other side, and giving vent to numerous small streams. The easiest route by which Russian troops could reach Khiva would be along the foot of these hills, at the distance of 5, 10 or 15 verstes from the sea of Aral. The road then passes near the Aksouat, and the Khodjabeg, two lakes about 40 verstes from each other. The latter is about 100 verstes from Khiva. It is only after reaching this lake that the water of the sea of Aral becomes fit to drink; the water here changes colour, becoming whitish by their mingling with the Amou. The southern part of the sea of Aral is full of islands, inhabited by Aralians, a people subsisting entirely on fish, and tolerably expert in the management of their vessels. They make use of sails; the Kirghiz, on the contrary, content themselves with coasting along in row boats as far as Khiva. I was assured they never used sails; being in that respect different from the Kirghiz at the mouth of the Emba, who have lately begun to make the journey by water. The Aralians are the only people who fish in the sea of Aral; the Kirghiz confine their fishing to the Sir. The same kinds of fish are probably found in the sea of Aral and in the Caspian. We saw at Bokhara a small kind of sturgeon, found in the former sea; it was 3 or 4 feet long. I imagine the western part of the sea of Aral is the deepest, as its banks are mountainous.

There are no marshes in the steppe. The Sir forms lakes from overflowing its banks at about 50 verstes from its mouth; some of them are dried up by the heat of the sun,and 10 verstes from either side of the river are plains covered with reeds. They resemble marshes, in spots where the inequalities of the soil have permitted the water to lodge every where; else the water filters through the road, without ever becoming stagnant. There are, however, places in the steppes where the soil is clayey, impregnated with salt, and where a person sinks in crossing, though no water is perceptible.

The climate of the Kirghiz country is very healthy; almost all strangers who reside some time have a disposition to grow fat; the air is very pure and light; in passing through we felt frequently the greatest pleasure from its fresh invigorating quality. Consumption or other

diseases of the chest are seldom felt, and the small pox is unknown. The Kirghiz, however, who come to Russia, are particularly subject to take the infection; as likewise in Bokhara, where it sometimes exists. The Kirghis have a great dread of this disease and with reason, as they generally take it at an advanced age, when it becomes most dangerous.

It is a great mistake to suppose the steppes of the Kirghis enjoy a cool or temperate climate. The heat is excessive, and the clay plains, or burning sandy deserts, retain a long time the heat, more so from the total absence of shade or vegetation.

In the commencement of May, the heat had already become almost unbearable. We moved with difficulty; all animals had sought what shelter they could find, and there reigned a dead silence. Dew is seldom known at this season, and towards the end of April the grass is already burnt up. In the month of June 1821, the thermometer at Orenbourgh rose 49° (Reaum) in the sun, and was 27° at 10 P. M. In the winter it often fell to 30°. The Kirghiz during the summer go almost naked; wrapping the skin cloak round the middle, leaving the back and upper part of the body exposed during the time they are at work.

To these burning summers succeed very severe cold in winter, but are more temperate to the south of the Moughodjar mountains and deserts of the Cara-coum.

Chapter III.

Khanat of Khiva—Route from Saratchik to Khiva—Khanat of Khokhan—Wild Kirghiz—Mountains of Ala-tagh.

It is not necessary to dilate much on the Khanat of Khiva,* M. Moraviev, who visited it in 1820, having published a detailed account of his journey. A daughter of Abulfaiz of Bokhara, contemporary of Nadir Shah, married the Khan of Khiva, named Kaip, of a Kirghiz family, from whom is descended Mohammed-Rahim, now governor, who is as enterprising as fortunate. He has succeeded in bringing under subjection many of the Turkoman tribes, situated to the south-east and west of his dominions. His power at present extends from the shores of the Caspian to the boundaries of Bokhara; the city of Khezarist or Hizarasp

* Khiva was built after the destruction of Urgung, once a great and powerful city, and capital of the kingdom of Kharasm, which Khiva now is.—*Translator.*

is his southern possession, and the tribes under him wander as far as the 40th degree of north latitude; the determined enemies of the Turkoman tribes subject to or bordering on Persia and Daghestan.* These Turkomans have rebuilt the city of Seraghs (Seerakees), a town about 200 verstes south-west of Mawri.

After the conquest of Mawri, Mohammed-Rahim Khan seized Seraghs; but, not being able to retain it, made it over to his Turkomans as a protection to his hereditary states. From the invasion of Persia other tribes of Turkomans have been incorporated with these people, who were expelled from Mangkichlak by the Kirghiz, and occupy the country as far as 44° north latitude.

The Turkomans who inhabit the shores of the Caspian have constant intercourse with Russia, from whence they import wheat and flour. They are determined enemies of Persia, and in 1813 sent a deputation to general Ritchev (Governor General of Georgia), begging him not to conclude a separate peace with Persia, as they hoped soon to gain some decided success over the common enemy.

The Khan of Khiva has succeeded in seducing the remaining tribes of Turkomans from their subjection to Bokhara, whose territories they now plunder to shew their attachments to their new master.

The rapacious Mohammed-Rahim is suspected of encouraging the plunder of the Bokharian and Russian caravans, and his subjects make excursions into Bokhara, but in small numbers, and secretly; their power being unequal to resist that of Bokhara, which is six times more numerous. In the year 1808 the Khan of Bokhara took Khiva, but restored it to its prince Veledi-Nassar: he died within a short time, and was succeeded by Mohammed-Rahim, who lost no time in recommencing his pillage of the territories of Bokhara. This he continues to the present time, returning evil for the favours conferred on his brother. He likewise attacked the Kirghiz who were established on the banks of the Sir, and carried off a great number of prisoners, whom he has obliged to take lands under Khiva. Mohammed-Rahim has dug a number of canals for the purpose of irrigation, one of which extends 120 verstes from the point in the Amou from which it originally is drawn off.

New Ourghendj is the most commercial of all the towns subject to Khiva, and the principal mart of caravans; it however contains no public caravanserais, where the merchants can dispose of their goods.

The inhabitants of Khiva are composed of Ouzbeks, the conquerors

* There are two provinces of this name, it must be a district of Mazanderam.—*Translator.*

and masters of the country; Turkomans, part of whom cultivate the soil without entirely abandoning their pastoral habits, Cara-calpaks and Aralians, Kirghiz, some Jews, besides the Tadjiks, or fixed inhabitants, of whom we will speak in the description of Bokhara.

Though the inhabitants of both Khanats are of the same race, language and religion, the Khivians have not reached so high a state of civilization as their neighbours; agriculture is less attended to; the habitations inferior; commerce more restricted, and customs more barbarous. The climate is colder, but the soil and productions are nearly the same as those of Bokhara, but not so abundant in Khiva; silk is not exported and bread generally dearer than at Bokhara. We will hereafter speak of the trade with Russia and the Khanat of Khiva, confining the description at the present moment to the route from Saratchik to Khiva.

Saratchik to the wells of Belawli, affording an abundant supply of water—4 marches.

Some wells are met with between that and the Emba of Djem—3 marches.

Sulphurous springs of Ioutch Kanata—2 marches.

To Mansoulmas 3 wells and abundance of water—3 marches.

Here commence the sandy hills, which cannot be passed in less than nine days, three of which are in very deep sand; water is found every two or three days; hills called Aïboughour—9 marches.

Near these wells runs a river cut from the Aral, and ending in a lake surrounded by sand, no water till within sight of Ourghendj—3 marches.

This route, which was performed in twenty-four days, was much more difficult than the one near Aral lake, which is, however, much longer. From Khiva to Bokhara it is 350 verstes.* The Amou is crossed opposite new Ourghendj, or at Khanka, distant from it twenty-five verstes, or at Khezarist, fifty verstes; still lower down there is cultivation for about twenty verstes on the banks of the river. The most frequented passage of the Amou in going from Khiva to Bokhara is at Koukertli (sulphur); the right bank of the Amou is here very steep. In leaving Khiva the road lies on the left bank of the river; the cultivation here extends about five verstes from the stream. The sands commence at Koukertli. There is another road by crossing the river at Tchoutchak (Outchchak) three legged, because these small hills here approach the river. This route is through many sand hills among which are frequently experienced very violent gusts of wind. This is the nearest road.

* Two hundred and thirty-four miles.

At Koukertli water must be carried, for the distance between that place and the cultivated lands at Bokhara, which extends to forty verstes of that city; indifferent water is procurable at Tcharkoucha. The route along the banks of the river has less sand, and is much better, but increases the length by 150 verstes.

The Khanat of Khokhan lies to the east and north-east of Bokhara; this country has been greatly increased since Tackhend was added to it in 1805, and Turkistan, and all the adjacent cities. It is bounded on the east by deserts, or the Sir-deria; on the south Kachghar-divani; on the east Ala-tagh; on the north Kazakli-djoulak and Sousak; on the south Och and Takht-Suleiman are its frontier towns. The Ak-mesdjid, on the Sir, is very well known by this name, which was given it on account of an ancient mosque situated there, of which the ruins alone are now to be seen. All the caravans from Bokhara to Petropavlosvk pass through this country. I have been told that the Isoun tribe, belonging to the great horde, frequents this neighbourhood. 100 verstes to the east of the Ak-mesdjid is Kazaklu-djoulak, a small town upon the Sir. In the distance may be seen the northern extremity of the Ala-tagh—this chain of mountains in separating from the Sir loses itself in the steppe and bears the name of Cara-tagh, from the neighbourhood of Turkistan.

Turkistan is defended by a fort, with a ditch of about fifteen feet wide, which can be filled with water. The Karatchik river runs about five verstes from the town, and irrigates the fields. The town has twenty-two wells, and about 1000 mud houses; it has the appearance of decay.

The tomb of Kara-Ahmed-khodja, one of the most revered Mahomedan saints of Turkistan, is situated near a Mesdjid which bears his name; in which there is an immense pot, at least twelve feet in diameter, resting on a stand of cast iron. The rich people dress food for the poor in this utensil, which is distributed on certain days in the year.

The population of Turkistan is composed principally of Kirghiz and a few Ouzbeks.

Tackhend, has at least 3000 houses, and is surrounded with a mud wall falling into decay; as are likewise the houses. The buildings, though intended to resemble those of Bokhara, are much inferior both in construction and materials. There are ten schools on the same footing as those of Bokhara. Canals from the Tchirtchik, which runs about twenty verstes to the south of Tackhend, supply the city with water, and irrigate the lands about it.

The territory of Tackhend produces cotton and silk; of which Turkistan has but a small portion.

The artillery of the beg of Tackhend consists of a few small guns (zumbarooks), carried on camels, like the Persians. In the neighbourhood of the town there are many villages, the principal Djiti-kend, Sairam, Karaboura, Tchimgha, Ikan, inhabited by the Ouzbeks; there are only a few Tadjiks and no Jews.

I have traced the map of this part of the country from a great number of routes. From Turkistan to the mouths of the Sir, from Bokhara, Tackhend, Khokhan, Khodjend, Ouratoupa and Samercand. From the information we were able to obtain it is clear the Russian map of Central Asia is very incorrect for the steppe of the Kirghiz; it is however, far superior to Arrowsmith's, which is still more so. In the constructions of this map, I have not adopted the Russian longitude and latitude of Khokhan and Khodjend; I have approached nearer that assigned by Arrowsmith, without having followed him as an authority.

Khodjend stands on the bank of the Sir, and it is necessary to pass through it on the road from Ouratoupa to Khokhan. This the best but the longest route, a difficult and mountainous country being avoided. The desert road leads from Marghalan to Samercand. Khodjend is a fortress surrounded with fields and gardens like Bokhara.

Khokhan, situated about ten verstes from the Sir, has at least 6000 houses, and is little less than Bokhara. Canals from the Sir convey water to the city. There are no walls round the town, but the palace is fortified and has two gates built with brick.

Khokhan has four caravanserais, where a great number of foreign merchants constantly reside. All the trade between Tackhend, Kachghar and Bokhara, passes by Khokhan. The two countries are constantly at war, but Bokhara is much the most powerful. During the last ten years, the Bokharians have taken Ouratoupa, which was formerly an independent district.

Omar Khan, the present ruler of Khokhan, succeeded his father, Narbouta, and lives in good intelligence with the Khan of Khiva, to whom he is related, and with the chief of Badakhchan, to whose daughter he is married. Marghalan, it is said, is of the same size as Khokhan. This is a very ancient city, as are also Andidjan and Namanghan.

Och, situated at the foot of the Takht-Suleiman, is not so large. This is a great place of pilgrimage; people come to pay their devotions at a small square building situated on the top of the mountain. Tradition states that Solomon sacrificed a camel on this spot; where the blood is

shewn on a stone still perfectly red. It is, however, particularly frequented by people suffering rheumatic or other pain; who are said to be cured by extending themselves on a flat stone near the building. M. Nasarov states having seen the ruins of two ancient buildings, under one of which there is a cavern. This is not confirmed by other travellers, who likewise deny the existence of columns. This superstition draws a great number of people to Och.

From Och to Kachghar no towns or cultivated fields are met with; the country is mountainous; the black or savage Khirgiz wander about with their flocks in the valleys of the Ala tagh. These people have more the physiognomy of Kalmouks than the other Kirghiz, they are brave, and their horses said to be as swift as those of the Tcherkes (Circassians).

The Chinese merchants unite in small caravans, and trade with the Kirghiz of the Ala-tagh; they come from Kachghar and Kouldja, and have nothing to fear from this small nation. The Kirghiz pass the winter in the valleys of these mountains, cultivating a little barley and millet. The district of Iedi-sou (Yedi), seven rivers, is their favourite resort.

In the spring of 1818 they pillaged some villages about Tackhend; this incursion was quickly chastised by 5000 of the people of Khokhan, who made a fortunate irruption into the mountains. I owe the description of these people to a Tartar, who was made captive by them, and was kept a prisoner for seven years. He informs me there are seven of the summits of these mountains covered with perpetual snow, and some fir and cedar trees in the valleys. This Tartar was once exchanged for *thirteen* horses;* another time he formed part of a marriage settlement. He at last escaped with some Chinese merchants, and remained some time at Kachghar; from thence he made his way to Bokhara, and was carried by us into Russia.

From Kachghar to Och, this Tartar forded several rivers, and travelled through a very mountainous country, which was covered with snow, though none was in the valleys. There were many very large trees, but he remarked neither oak nor firs. The descent of the mountains was much longer than the side by which he had ascended, and the cold very severe.

Another traveller informs me there exists almost eternal winter on the Terek. There are three routes to choose in passing these moun-

* I think this must be a mistake; for nine Russian soldiers taken by the Persians were exchanged by the Prince of Casbin for a Turkoman horse, which is always considered the most valuable animal of the two.—*Translator.*

tains, in which the valleys are avoided on account of the depth of snow. The first that of Belawli or Tallig, to the north of the mountains; second, by the Terek in the centre; the third, that of Chart to the south.

Chapter IV.

Kachghar.

From all the information I was able to obtain, the Bokharians call Chinese Tartary, Alti-Chakan, or the six *cities*,* viz. Kachghar, Iarkend, Khoten, Aksou, and the two Ilys.

Kachghar is a large city, with a Chinese garrison, to which strangers enter and depart without difficulty. It is situated on a river of the same name, which falls into the Kizil-sou (golden river), which flows between Kachghar and Iarkend, a town on the great road from Kachghar to Cashmere, where they speak the Tartar language.

From Iarkend, the route lays through the towns of great and little Tibet; the country is very mountainous, and the caravans are obliged to make very short stages. The traffic is entirely carried by horses, as camels cannot pass over the rocks and mountains. The route is, Iarkend, four days journey; great Tibet, thirty-five or forty; and Cashmere, twenty-two. Half way between the two last named places, is the town of little Tibet. The river which passes this place is the same as the Cashmere stream, or one of its branches.

It appears probable that the towns, called great and little Tibet by the Tartars, are those more generally known by those of Ladak and Draouse, or Dervazéh. It is strange that none of the Tartars know them by this name;† all the Bokharians with whom I have conversed on the subject invariably gave them the application of great and little Tibet; also the Russian merchants, who trade between Semipalatinsk and Cashmere, call them by the same name.‡

* More properly countries or provinces.—*Translator.*

† The names of great and little Tibet comes without doubt from the habit several Oriental nations have, of giving the name of *belad* or *chehr* indifferently to a province, district or town.—*Note by M. Jaubert.*

‡ After the publication of this work I met with an account of the travels of a Georgian gentleman, Danibeg, translated from Georgian, and dedicated to the emperor Alexander, from India to the Russian frontier town of Semipalatinsk. I have abridged the facts related by the Georgian as much as possible, the work containing no other matter of interest.

From Cashmere I reached Tibet, a distance of 200 verstes, performed in twenty days.

Between Cashmere and Kachghar, there are no other towns than those I have already mentioned. Immediately in their neighbourhood, there are a few villages scattered in the mountains. Both great and little Tibet are surrounded with gardens. The houses are of wood, as in Russia, and the pent of the roof very high. They are followers of the Grand Lama.

This town is built on rocky hills, among which grow some oats; the inhabitants make a kind of paste of this, by boiling it in milk, which composes their sole provision. They are miserably poor, and the custom exists of several brothers having only one wife. A great deal of tea is used at this place. The wool from which the shawls are made comes from Lassa. Merchandize is here carried on sheep. From here to Cashmere the transport is however on horses.

NOTE.—Russian goods in considerable quantities might be sold at Tibet, such as silk and goldsmith's works. The Tchabas would readily purchase them. These people bring a great deal of goats' hair from Lassa, which is dispatched from hence to Cashmere. The journey from Lassa to Tibet occupies about three months.

I was six weeks travelling from Tibet to Iarkend; the journey was very tiresome, the looseness of the soil, the great precipices, the immense height of the mountains interspersed with glaciers, made a most melancholy impression on my mind; which was augmented by the complete solitude, for these districts are uninhabited. At last we came in sight of Iarkend; it is surrounded by clumps of trees, and has a very cheerful look.

The Chinese garrison contains about 2000 men; their chief is called Amban: more than three thousand Chinese are employed here in commercial pursuits. The climate of this town is healthy, but the water is bad. There are no fine buildings; the inhabitants appear in tolerably easy circumstances. In saying the climate is healthy I must except the autumn; I never met with any worse. The sky was covered with clouds of a singular kind of dust, of which the cause is unknown: it fell like rain; and the great dampness of the atmosphere gives birth to a kind of insect, called karbites, by the inhabitants, the sting of which is almost always mortal. When the inhabitants see clouds of the above-mentioned dust instead of rain, they hope for a good harvest; and an indifferent one when they have only common rain. The gale of dust sometimes lasts seven or eight days; it is so thick that the rays of the sun cannot pierce through it, and at the same time so fine that it finds its way through the smallest opening.

Besides Iarkend, the Chinese possess Houdam (Khoten,) Gachghire (Kachghar,) Aksou, Douroban and Ily; each of these cities have a governor of this nation. The Chinese are very numerous at Ily or Kouldja; indeed the number is said to amount to above 10,000. They are very proud and lazy, and spend all their time in smoaking. No inhabitant can leave the town without a passport; and it is very difficult to escape this precaution, as the surveillance of the authorities here is very severe. It is one of the means made use of by the Chinese to put a stop to disorders of all kinds.

From Iarkend I took thirteen days to reach Aksou. This Town is not larger, but contains many tolerably well built houses; it is situated in a valley, and divided into two parts, the one inhabited by the Chinese, the other by Mahomedans, who keep up a constant communication with each other. From Aksou, I was three days going to Tourfan, a small and ugly town. As its inhabitants are very few, it contains nothing worthy of remark. The frontiers of the Kirghiz country are about twenty verstes from this place. After leaving Tourfan, I passed several wandering tribes of Kalmouks, Kirghis and Kaisaks, and at last arrived at Semipalatinsk, after a three months journey.

I have fixed the frontier of great Tibet in 35° 50′ N. lat. and 76° 35′ E. long. from Paris. The following latitudes and longitudes I have drawn from the tables of the great Oriental geographer Oloug-beg, which I procured at Bokhara; and I place them beside those to be seen in the edition published by Gravius in 1652; the latitude of Bokhara is the only one I have been able to verify, and found correct to within about two minutes.

Table of Latitudes and Longitudes according to the Bokharian Manuscript.

Names.	Latitude.	Longitude.	By Gravius. Latitude.	By Gravius. Long.
	° ′	° ′		
Bokhara	39 50	97 30	....	96 30
Samercand	39 37	99 16	....	
Carchi or Nesef	39 „	98 „	....	
Khodjend	41 55	105 35	....	100 35
Badakhchan	37 10	104 24		
Anderab	36 „	108 45	....	103 45
Kech	39 30	99 30		
Koubadian	37 45	102 „		
Talikhan	37 25	102 50		
Khowarezm or new Korkandj	42 35	93 45		
Darghana-tach or Korkandj	42 17	94 30		
Hezarasp	41 „	95 „		
Kath	41 36	95 „		
Darghan	39 30	94 15	....	95 5
Izfidjab	43 36	99 50		
Taraz	44 31	99 50		
Ourouchna or Osrouchnah	40 „	105 „	....	100 „
Saghanian	38 14	105 30	....	100 30
Bech-kend or Penkat	43 „	101 „		
Ilak or Tounkat	43 25	101 „		
Ferghana or Akhsekat	43 25	101 20		
Ourkend	44 „	102 50		
Och	43 20	102 20		
Kachghar	44 „	106 30		
Houchach or Tchadj	42 30	109 „		

The accounts given by Oloug-beg do not agree with these I have obtained elsewhere; they are, however, so far curious, that this author mention towns which no longer exist, and of which no traces even are left: perhaps, however, I might have been able to give some interesting information concerning the ruins of these towns and the history of their destruction, had opportunities occurred of consulting Bokharians possessed of more intelligence than those that fell in my way. From Kachghar to Semipalatinsk, the journey occupies fifty-five days, twelve of which are to Askou, and twenty-five to Kouldja.

We are informed in the excellent work by M. Ritter, that the easiest passage among the mountains to the north of Kachghar is near Aksou. I ascertained the truth of this statement; nevertheless the caravans always go round, and have good reasons for taking another road. In going from Kouldja to Aksou they keep near the Chinese frontier, because they are sure of not being pillaged. In the same way, the caravans from Khiva, when they go to Orenbourg, pass by Saratchik or Saratchikova, and afterwards keep along by the Oural, instead of going from Khiva to Orenbourg by crossing the steppe of the Khirghiz.

From Kouldja to Semipalatinsk, the widest river is the Alaghouz; it flows to the north of the Tarbaghataï hills; the highest mountains are the Tchoulk-caraghai, 100 verstes from Kouldja; it takes two days to cross them.

There are two Kouldjas, the great and little; both situated on the Ily, and about forty verstes from each other. The caravans pass by little Kouldja, which lies to the north of the other. It is a fort without the slightest resemblance to those of Bokhara. It is more like an European fortification, having projecting angles and a species of bastion: a gun fires at sun-set, and the gates are immediately closed. The governor of the place has the title of Dziangghioun, and the police master that of Kalatai. Three Kirghiz and five Chinese had been beheaded for various crimes in the course of three months. Near the temples are idols of different sizes, made of clay, with embroidered dresses, and their hands folded over the stomach. Inside the temples the idols are generally of gold, enclosed in glass cases; bread is placed before them.

Kouldja, in the Chinese Dzoungarie, is defended by a garrison of about 10,000 Tchanpan, or Chinese foot soldiers. This town has six gates, and contains about 9000 houses, built of mud or wood. There are also some built of stone, and they all have roofs like Russian houses. Kouldja is not surrounded by fields; there are half a dozen villages inhabited by Chinese, at about thirty verstes from the town.

The Talku mountains are covered with magnificent forests, which supply Kouldja with wood. Generally speaking, the Kalmouks in this country are wandering tribes; a few have taken service under the Chinese, but in general there are very few with fixed occupations.

Besides the Dounganu-Tartars, a great number of Chinese are found at Kouldja: they are distinguished from the Kitaizi, or black Chinese, whose women have small feet

Near Kouldja the Ily is hardly more than 100 feet wide, and it may be forded in most places.

Chapter V.

Khanats of Hissar, Koulab, Ramid and Badakhchan—The Ghaltchas—Gold found in the Derwazeh river—The Siah-pouches—Khanats of Chersabés.—Itinerary from Bulkh to Caboul, and from Bokhara to Herat.

We have now to consider the countries situated to the south and west of Bokhara. We find the Mahomedan Khanats of independent tribes, who profess the religion of the false prophet, and others who do not believe in him, and are called by the Mahomedans infidels; all their people inhabit a mountainous country.

The richest of these states is the Khanat of Hissar. The Khan resides in the city of the same name as the province; it is situated about fifteen verstes to the west of the banks of the Saridjouï, or Kafer-nihan. He is father-in-law of the Atalik; and the faithful ally of the Khan of Bokhara.

The town of Hissar contains about 3000 houses; it is situated in a well cultivated valley, abounding in pasturage; almost all the inhabitants of this country are Ouzbeks, but a few Tadjiks are found in it, most of them very rich It is said that the Ouzbeks sometimes bring millet to the market; and, if they are unable to sell it, they throw it away, to save themselves the trouble of carrying it home. They possess considerable flocks, and are, to a certain degree, in easy circumstances.

The towns depending on the Khan of Hissar, are Deïnaou, the most considerable after Hissar; Saridjouï, Toupalak, Regar or Reg-ara, Caratagh, Dechtaband, Tchockmazar and Khodja-Taman. At the last place there is the tomb of a saint highly revered by the Mahomedans.

Ramid, 100 verstes north of Hissar, is a pretty large town; its khan commands the services of 10,000 men in his excursions. One of the highest mountains in the country rises near Ramid.

Koulab, containing about 3,000 houses, is to the east of Hissar, on the road from Badakhchan to Khokhan; it is independent. All these towns are inhabited by Ouzbeks, of whom a great number are agriculturists.

The khan of Abi-gherm is often at war with that of Hissar.

To the south of all these towns is the Khanat of Badakhchan; its capital, which bears the same name, but which is also known by that of Feizabad, is situated on the banks of the Badakhchan, which falls into the Amou. It is one of the most important Khanats of this quarter, though it furnishes no articles for commerce that I am acquainted

with, except lapis-lazuli; besides it is not on any of the great commercial roads.*

To go to Cashmere from Badakhchan, the route lays either through Kachghar or Peichawer,† which appears to indicate that the mountains which separate Badakhchan from Cashmere are impassable.

In the mountainous country east of Bokhara and north of Hissar, are found the Ghaltchas, a poor but independent people, professing the Mahomedan religion, of the Sunnie sect. Russian travellers give them the name of Eastern Persians, and they know no other language; their features differ much from those of the Tadjiks, and are even of a darker complexion than the Arabs of Bokhara. They inhabit miserable cabins in the valleys, are all cultivators, possess some cattle and very few horses.

Matcha and Ignaou are towns inhabited by the Ghaltchas, and situated to the north of Khokhan. A great number of Ghaltchas frequent this place, to exchange their goods for what they require.

This people extend further and further into the mountains, which are at present little known. Beyond is the country of the Kafirs, who they represent as a savage and barbarous race.

After passing Karateghin no more Mahomedans are met with. The inhabitants of this town are, however, not barbarous; the redoubtable Kafirs dwell in Calei-khoum, called also Derwazeh, and situated on a river of the same name. The country between Hissar and Derwazeh is so mountainous, that it is often necessary to lead the horses by the bridle. The roads are excessively narrow; and the precipices very steep, at the bottom of which the Derwazeh rolls with a thundering stream. Gold is found in the sands of the Derwazeh. For carrying water, skins are generally used in Bokhara, which preserve the form of the animal to which they once belonged. Those of sheep or wild goats are considered the best. They are filled by an opening left at what was the neck of the animal. The Bokharians tie the water-skin to a rope, and throw them into the Derwazeh; the violence with which it runs soon fills the skins with mud, sand, and some gold; which last it is afterwards easy to separate from the mud by washing; but as it is never without alloy, its relative price to that of pure gold is as 18 to 21. This custom may serve to elucidate a passage in Herodotus, where he describes the means used by the Indians to obtain gold from sand.

* There is a route through Badakhchan to Cashmere and Tibet, not through Cashghar or Chinese Tartary.—*Translator.*

† A third road as I before mentioned ascends the Oxus to its source, and goes by Juduck, —*Translator.*

To the south and the east of Badakhchan are found the Siknans or Siah-pouches, a half wild, wandering, people. They are not Mahomedans; are clothed only in the skins of black sheep, and their name, which signifies black clothing, is derived from their dress. Their country lies in the direct road from Khoulm to Peichawer. It is then necessary to pass by Tchetrar, their principal town, by Koundouz, and through such a mountainous country, that the roads are almost impracticable; and for that reason this road is very seldom taken. The khan of Badakhchan is constantly at war with this people, and prisoners then taken are sold by the merchants of Badakhchan at Bokhara.

There is an independent Khanat in Bokhara, Chersabés, or Chehrisebz, so called after its principal city, which is situated on a river of the same name. It is the same as the Kachka, which passes by Carchi, one of the largest towns of Bokhara. This river has several times preserved the independence of the Khanat of Chersabés, became, by means of dams, the whole country surrounding the city and fortress may be laid under water, which effectually prevents the Bokharians from taking possession of it; besides this the Ouzbeks of Chersabés are celebrated for their courage.

This Khanat, which had been joined to Bokhara by Mohammed-Rahim khan, separated itself again from it at the death of that prince. The loss of this territory must have been sensibly felt by Bokhara, for it is rich in various productions, and a river runs through its whole length. Very good cotton and roots for dying are sent from thence to Bokhara, and they receive in exchange iron, leather and other merchandize from Russia.

The khan of Chersabés can bring into the field an army, or rather *levée en masse*, of about 20,000 men.

The cities dependent on him, are Kitab and Douab, two fortresses, Djaouz, Pitahaneh, Iakabak and Outakourghan. Chersabés is besides deserving of attention from the circumstance of its having been built on the site of the village of Kech, the birth place of the famous Timour.

I will now lay before the reader two routes; one from Balkh to Caboul, the other from Bokhara to Herat—and will add a few words concerning the Khanats through which the roads lie, which will comprise all the information I was able to attain relative to the Khanats lying round Bokhara.

Nothing is more variable than the limits of a Khanat in Asia; for example, Balkh, which is probably the ancient Bactra, belonged to an independent khan; the shah of Afghanistan dispossessed him of it about fifteen years ago; but Kilitch-atia-khan, of Balkh soon recovered

his independence; and, at his death, in 1820, he recommended his two sons to the khan of Bokhara.

In the following year, Kataghan, chief of the tribe of Ouzbeks of Tchehlminar (forty towers), made incursion upon the territory of the two youths, and drove them out. Upon this the khan of Bokhara dispatched a force of 12,000 men against Kataghan, and forced him to take shelter in the fort of Balkh, where they hoped soon to take him prisoner; affairs were in this state when I left Bokhara.

In going from Balkh to Caboul, the first day's halt is at the tomb of the shah Merdan; where there is a small hillock. The second stage is to Khoulm, an independent town; when it belonged to the Afghans, a duty of two and a half per cent was exacted upon all the merchandizes belonging to the caravans that passed by; the same duty was also levied at Balkh and at Bamian.

After Kilitch-Ali, khan of Khoulm, had thrown off the yoke of the Afghans, he no longer levied any tax upon travellers. A Mahomedan law forbids all persons who cannot keep a standing force of 12,000 armed men to receive any other tributes than the *zekat* and the *ghar chour*; and consequently does not permit them to tax travellers.

The son of Kilitch-Ali, whose religious scruples were less than his father's, re-established the duties. He died about three years since.

It is said that five rivers unite at Khoulm and form a cascade. The Khoulm river falls into the Amou. I have been assured that the city of Khoulm, properly so called, has been entirely destroyed, and that the town now bearing that name is the one formerly called Tachkourghan, about sixty five verstes from Balkh.

It is a day's journey from Khoulm to the fort of the Aïbek. The road lies along the river of Khoulm, which rises in the country of the Douab, at the distance of about four day's journey. The banks of this river are covered with fields and gardens.

A river rises in the country of Feizabad, which falls into the Khoulm near Aïbek.

The distance from Aïbek to the Douab is reckoned at fifty-six verstes; from Aïbek begins the magnificent valley of Arizandan, full of gardens; and eleven verstes farther is the town of Serbagh.

After a journey of twelve verstes from Eiba, we arrive in Ghourram; a country filled with villages, and very thickly peopled. By following the source of the Khoulm river, the road lies through a valley, which becomes very narrow at fifteen verstes from Ghourram, near Roui; close to this village the road turns to the left, to Douab, at the distance of about forty verstes.

Here it is necessary to cross the mountain of Carakoutal, which

occupies half a day. From this several small fortresses, or villages, surrounded with water, are passed; and the inhabitants furnish provisions to the caravans. These castles are known by the name of *Mader.* Eight verstes farther are other fortified villages, called Kameder, and surrounded by fields and vineyards. They are supplied with water by the sources of the Enden, lying just to the south of these forts. Half a day's march from Kameder brings the travellers to Saikan; after having crossed a very high mountain called Nalifarch. At twenty verstes from Saikan rises the mountain of Agrabad; the fortress of the same name lies at its base. This country is rich and well cultivated, possessing mines of copper, silver, and gold. The shepherd there mounts guard; that is to say, all the inhabitants are soldiers; in spite of which, they have been unable to maintain their independence, for the fort has successively been subject to the shah of Afghanistan, and the khans of Koulm, shewing the possessions of the latter to be sometimes of great extent.

Beyond Agrabad there are some small hills, and after passing them, and travelling 20 verstes, we reach Bamian, a very ancient city, containing about 20,000 inhabitants, and surrounded by numerous villages. In the neighbourhood are many rivers, and grottoes, containing sculptured figures; and on the summit of a neighbouring mountain, there are two statues of prodigious magnitude.

I was assured each of them was 20 toises in height, and a Hindoo told me one of them was a representation of their god Rama. These colossal statues have long been celebrated in Europe, and are still in existence. A Cashmerian told me gravely that the shah Merdan (probably the one buried between Balkh and Khoulm), had killed a dragon that had long inhabited the summit of one of the Bamian hills, and that the tears which fell from the eyes of the monster gave rise to the streams which have ever since watered Bamian.

The country is defended by 56 forts. A ruined town, called Mouja, or Mija, lies a day's journey to the north of Bamian.* At three verstes from Bamian the river of the same name flows towards the east. The fort of Toptchi is 2 verstes farther on. At this place is crossed the Choutour-Gherdan, the highest mountain between Balkh and Caboul.

The traveller then reaches Kalou, a fort in the midst of mountains, and containing about 200 houses; nine verstes farther he passes the fort of Hadjihab. He then meets with a mountain and a village, whose name is apparently Arabic, containing only about 40 houses.

* The city of Bamian was destroyed in 1221 by the Mongols, who massacred all the inhabitants; for this reason they gave this city the name of "dwelling of sadness."

It is afterwards necessary to travel 40 verstes, through a mountainous country, to reach the three forts of Bikala, or Gherdan-Divani; after half a day's journey, through a gently undulating country, the sources of the Ser-tchechmeh* are attained. They form a large basin, and the oriental travellers, who are all lovers of the marvellous, record that it is inhabited by miraculous fishes, with pearls in their noses, and which occasion the death of any person attempting to catch them. This is the real frontier of Afghanistan; Caboul is at the distance of nine *farsahks*, or about seventy verstes.

This route was communicated to me by a merchant, who had travelled at least thirty times from Bokhara to Caboul; it shews the distance from Balkh to this last town to be 392 verstes, and it takes the caravans twelve days to perform the journey. The Ouzbeks extend along this route beyond Bamian. The mountainous country just before reaching Gherdan-Divani is inhabited by Kezareh; and after passing this fortress the country of the Afghans commences.

I shall only detain the reader by a few words regarding the princes of Afghanistan. Kamran, governor of Herat, is the son of Mahmoud Shah; this latter was king of the country and had a vizier named Fatih-khan, a man belonging to one of the principal families, and had seventeen brothers, the eldest of whom Mehemed-Azim-khan was governor of Cashmere.

Kamran, jealous of the power of his vizier, induced him to come to Herat, and then put him to death. This atrocious action, which took place in 1819, was the signal of a general revolt in favour of the family of the vizier.

Mahmoud, forced to fly from Caboul, took refuge at Herat, having there established a state independent of Afghanistan. Mehemed-Azim-khan hastened to Caboul, installed himself there as prime vizier, and left nothing but the empty title of shah to a relation of Mahmoud-khan.

Perhaps the English are not altogether ignorant of these internal dissensions, which greatly weaken Afghanistan; on the other hand, its inhabitants, divided into parties, might easily fall into the hands of the shah of Persia, and under him become a formidable and powerful neighbour to Hindoostan.†

* In Persian Sir-aheshma or head of the springs.—*Translator.*

† It is singular that two of the members of General Yermaloff's mission should have almost immediately on his return been despatched into Tartary; General Nigirey a Greek and Turkish interpreter to Bokhara; also Captain (now general) Mouravieff to Khiva, who both point out this as a route by which the British in India might be threatened, if not attacked.—*Translator.*

The Seiks took advantage of the absence of Mehemed-Azim-khan to possess themselves of Cashmere, and this gallant people now reign in the beautiful valley of Sirinaghor.

The route usually pursued from Bokhara, to the city of Herat, containing about 4000 houses, passes by Kirki upon the Amou and by Ankoi. The country along this route is only cultivated to the distance of twenty-five verstes from Bokhara. The steppe there commences, in which the Kirghiz who accompanied us graze their camels.

After having travelled about 150 verstes, we passed Carchi on the left, and arrived at Kirki. The principal routes from the Amou to Herat pass by this place, and Tchardjoui: double the extents of sandy plain is crossed by taking the road from Tchardjoui to Mawri, or Meer, as in going by Aukoi and Kirki, a small fort, containing 100 houses, and surrounded by a wall with battlements and a ditch.

It is said that the Amou at this spot is more than 200 toises broad, and four or five deep; its banks are rocky, very steep, and about three or four toises high.

Ankoi is a large and independent town, containing about 4000 houses, inhabited by a small number of Ouzbeks and few Tadjiks, and a great many Arabs.

A small river runs by this city; it dries up in the summer, and the inhabitants are obliged to dig wells to procure water. Ankoi is about 100 verstes from Balkh, and 120 from Kirki. From Ankoi to Meimaneh the distance is about eighty verstes. There are a few villages in this road, Meimaneh is a town containing about 1000 houses, and inhabited by Ouzbeks, who resume their wandering habits during the summer season; they are confirmed robbers, pillaging the caravans; and are frequently at war with their neighbours, make incursions into Khorassan, and carrying their prisoners to the slave market at Bokhara.

Beyond Meimaneh and as far as Herat, the country is mountainous; but contains some roads practicable for artillery. From Meimaneh they count about sixty verstes, to Mourghab, a river six toises wide, whose banks are rocky. It is only on the banks of this river that some willow and poplar trees are ever found; on all the rest of the route there are nothing but bushes and pistachio trees, the latter in great abundance.

The Eimaks and the Ialountouches wander among these mountains, and along the side of the Mourghab; they are Mahomedans of the Sunnie sect, and speak Persian; their features more resemble those of the Tartars than the Ouzbeks; they inhabit about 3000 felt tents, or kibitkas, and are greatly addicted to pillage. If a small caravan has occasion to pass through this country, it is necessary to obtain the protection of one

of the chiefs, and he will then accompany the travellers, and serve them both as a guide and protector. About 30 verstes beyond the Mourghab, the route passes to the left of Mawroutchak, a town about 180 verstes from Mawri. From the banks of the Mourghab to Herat is only fifty verstes; according to the distances laid down in this route Herat is 310 verstes from Kirki.

Among the people inhabiting the neighbourhood of Bokhara, of whom I have spoken, it is possible there are some unknown, in which case I shall have attained my object, if I have contributed any thing to the geographical information, though not complete, to that already possessed, concerning these distant countries.

V.—*On the advancement of Geological Science in India.—By Captain* J. Campbell, *Assistant Surveyor General.*

In the study of the fossiliferous and stratified formations of Europe, considerable progress has been made of late years; but, eclipsed by this fascinating employment, the study of the primary rocks has been almost quite neglected. Dr. Boase remarks* "that, with the exception of Dr. "Macculloch, no geologist of note, in this country, has published any "minute, and descriptive details concerning the primary rocks; all "have been absorbed in the pursuit of the wonderful and fascinating "knowledge unfolded by the fossiliferous strata." The same author remarks that Professor Sedgwick has pointed out the necessity of attention to the study of the primary rocks, and that De La Beche is engaged in the examination of Devonshire. The Islands of Great Britain afford but few opportunities for the study of primary geology, the tracts are few and confined, and it may be even doubted if there is any formation of true granite, or formation in which granite prevails. Even in the rest of Europe, where the primary rocks prevail, the climate impedes, in a great measure, any proper examination. In the absence of a sufficient collection of facts, on which to base a theory, the consequence has been, that authors have promulgated various conflicting systems. One supposes the stratified primary rocks to have been formed by aqueous action from the debris of the unstratified rocks; another, that the stratified primary rocks are of aqueous origin, and of prior formation to the unstratified, by which they have been metamorphosed and indurated. And lately Dr. Boase produces plausible evidence of both stratified, and unstratified being of contemporaneous origin.

* Treatise on Primary Geology, 1834.

The peninsula of India presents a vast field for the study in question, where the formations, of enormous magnitude, extend sometimes for 50 miles, presenting to view the same kind of rock, until its peculiarities and varieties can no longer be overlooked. Compared with this vast field, the primary formations of Great Britain and even of Europe sink into insignificance, and we require nothing but energy and application, to collect the necessary knowledge, and possibly to unravel the law by which the formation has been aggregated. Towards the point of the peninsula, it appears that granite is the prevailing rock, without any kind of schist or stratified rock to conceal it from our view. As we advance northward, we find the surface clothed with schists, limestones, and trappean rocks; and, possibly, to the extreme north, the secondary rocks may prevail, indeed we know them to be fossiliferous. But of this vast continent, we know comparatively little. With the exception of a very few, but excellent, papers, giving minute descriptions of small patches, we have no data to turn to. We hear of mines of the common metals, and of diamond mines, &c. but generally the mineralogy has been entirely neglected. We know nothing of the probable metallic resources of the country; and of the metals rare and scarce in Europe, we have not once any mention, though I have reason to believe that titanium exists in great profusion, and possibly many others of the same kind. Because these minerals are almost unknown in Europe, it is no reason that they may not be brought into use in the economy of the arts, if we can produce them in sufficient quantities; but to do this, we must attend to the aids which chemistry affords us.

The complaint of want of geological description, is not, however, confined to India alone. Dr. Boase remarks, "In most of the lately pub-"lished geological accounts of countries, we look in vain for details con-"cerning primary rocks: we sometimes, indeed, hear that such, and such, "a district consists of granite, but cannot collect any information con-"cerning its composition, or the manner in which its varieties are asso-"ciated together. We are left quite in the dark as to the nature of this "kind of rock: for the various kinds which may come under the desig-"nation of granite are not only exceedingly numerous, but have very "frequently no resemblance whatever to the common variety so uni-"versally known by the name granite."

For want of the necessary details alluded to by Dr. Boase, much of the information which has been published, descriptive of India, is of little use. We are told that gneiss abounds in Ceylon, but I believe, it will be found that gneiss is as rare there, as in South India. Dr. Benza has asserted that hornblende slate is common in Salem; he pro-

bably made use of the term in its generic sense, following Dr. Macculloch; but the truth is, that hornblende slate is almost unknown in the district of Salem: but had a description of the mineral been appended, we should have been led into no mistake.* Observers therefore should in future be careful to append mineralogical descriptions of the rocks to which they allude, or at least to make accurate references to mineralogical works, where the description of the characters agree. An attempt is sometimes made to shew that this attention to mineralogical minutiæ is not necessary, or to assert that the name of a mineral or rock, sometimes depends on its geological position; but this can never stand good: we cannot make a sheep into a horse, by putting it into a stable; and many cultivators of science may be sceptical on what are called "the principles of geology," or even deny the dogmas of theorists altogether. Dr. Boase remarks "If a "rock be designated according to its geological relations, its name "must be liable to change, because the principles of the science are "not, as yet, permanently established: besides, on this plan, in the "examination of countries previously unexplored, too much depends "on the correct judgment of the observer: but when a rock acquires a "name, from the nature of its composition, whether purely mineralogical "or blended with organic remains, then this part of the science becomes "perfectly descriptive, like the other branches of natural history; and "much curious and accurate information may then be expected from "travellers, who are not accomplished geologists."

Another common error with observers, is the application of the mineralogical name of a rock, to many of the varieties which are intermediate between it and some other mineral: this should carefully be avoided, and the typical specimens of the rock, having been once described, its varieties when mentioned should be named "varieties."

Another error is the abuse of the term "decomposition"—every rock which is soft or friable, is called decomposed, very often without the slightest proof. The chalk of England is soft enough, but not I believe considered generally as decomposed. It is common to call the Indian cotton or regur soil, "decomposed" from trap rocks. It resembles in some measure the lias clay of Dorsetshire, as far as my memory can carry me, but I believe the lias of England was never called decomposed. It is common in India to find fissile, friable, gneiss embedding round blocks of granite, and this gneiss has been termed "decom-

* I am concerned to hear, that this talented officer, Dr. Benza, who must be considered as having led the way, in first drawing attention to the geological examination of the South India, is now no more.

posed." It might have disintegrated in structure, but decomposition is impossible, because that would have destroyed the fissile structure. Disintegration, and decomposition, are two very different operations—the one mechanical, the other chemical. An instance of disintegration without decomposition is seen in the masses of quartz rock in India, which are always disintegrated, but never decomposed. In India, a piece of quartz larger than the cube of one inch can never be found without cracks, but it never presents any appearance of decomposition. If we heat a piece of glass, and plunge it in cold water it falls to powder or cracks to pieces, it is disintegrated, but not decomposed. Each particle is still a silicate of soda. In the same way most crystalline particles of disintegrated rocks will be found to have a porphyritic or a granular, aggregated structure.

In collecting information on Indian geology, the greatest difficulty appears to be, that the number of people, who have time and opportunities for the pursuit, are very few; but if every one who chooses to attend to the subject, would apply himself, to compile accurate descriptions of the part of the country, adjacent to their stations, we should soon have a valuable collection of the geology of isolated spots, which those who are employed by Government in these scientific pursuits could soon and easily connect together. In the furtherance of this end, a geological society would be of the utmost advantage—they would receive and assist in the discussion of such information, compare specimens, have chemical examinations made, and afford that information and directions to tyros which no printed work on the subject could give,—and particularly any individual of the society who has had the advantage of studying the science practically in Europe, could then afford the most valuable information, in identifying minerals with those of Europe.*

In the study of the primary rocks, we cannot advance one step without the aid of mineralogy, but this science unfortunately is still in its infancy, and even the principles on which it is to be based are not yet agreed on. Mohs, in his system, considers the crystalline form alone, and rejects all minerals which are amorphous. Dr. Thomson,

* This Journal is published by a Society, of the prototype of which it was declared by Sir William Jones that "the bounds of its investigation will be the geographical limits of Asia; and within these limits its enquiries will be extended to whatever is performed by man or *produced by Nature.*" The sub-division of scientific labour does not seem called for here as in Europe, where there are so many labourers in the field; so that a Society for the cultivation of each science is not desirable; and the Meetings of the Madras Literary Society may be made the place of reunion for all geologists, and its already large mineralogical cabinet the receptacle for specimens. Our correspondent is reminded that the Society will be thankful for specimens illustrative of his remarks, which are usually transmitted by Authors.—*Editor.*

in his valuable work of 1836, shews that the chemical composition is the best basis on which to classify minerals, and he gives the component parts of nearly 500, many of which were analysed in his own laboratory. In the elementary state of our knowledge on this subject, it is not to be wondered at, that many discrepancies occur. Klaproth gives an analysis of hornblende, by which he makes it ferruginous, containing thirty-three per cent of iron, and only three of magnesia, but Dr. Thomson's hornblende is magnesian, containing thirteen per cent of magnesia. There is little doubt, but that the two specimens must differ much in appearance, and we may therefore avoid the mistakes, which would be produced by preserving typical specimens of the minerals to which we apply a name.

Mineralogy considers only single minerals, and compound rocks composed of these minerals are therefore excluded from the science. This subject, a sort of " rockology," might be considered a science of itself, but we are destitute, almost entirely, of any information on the subject. Dr. Macculloch is the only one who has given it sufficient attention. His work " On Rocks" of 1821, however, has many objections, and although very useful, a fresh work is very much wanted. The nomenclature also requires complete revision to prevent the absurd contradictions that writers have fallen into. We find *eurite* defined by the best authorities as " felsphatic granite containing crystals of felspar,"—" a granite composed principally of felspar, finely granular or nearly compact," —" composed principally of compact felspar"—as being another term for " compact felspar." Chert is called " hornstone"—" indurated lime stone"—" a modification of silicious earth"—" Paris burr stone"— " a cavernous silicious rock." Hornstone is, " flinty slate without the slaty fracture"—"silicious schist"—"strongly resembles basalt."—Diallage rock is "diallage and saussurite" "diallage and felspar." Saussurite is " hard silicious serpentine"—" jade or anestone"—" nephite," and so forth : the names being applied at the fancy of the observer, until they may be shewn to mean literally nothing. The multiplication of *names* I consider to have caused the greatest injury to the science, and I conceive them to be by no means necessary, for by combining the generic term for a mineral, with other terms, denoting the structure &c., I think we may in great measure avoid their use without being misunderstood. As an example we may take a single mineral " hornblende ;" then we have "*crystalline* hornblende," or aggregated in large crystals; "*granular* hornblende ;" " compact hornblende" (if such a rock be found); " *granitic* hornblende."—Hornblende rock or black granite,—" hornblende porphyry."—Hornblende in grains embedded in a paste of felspar, the porphyritic sienite of Jameson, " schistous hornblende porphyry."— Hornblende slate, " foliated hornblende." Hornblende in scales (if such

a rock be found), lamallan or schistous hornblende, an homogenous rock like argillaceous slate. A term for greenstones might be easily found, to denote the partial admixture or combination of the structure of the hornblende porphyry, without miscalling *black stones, green stones.* The term schistous, too, has been most sadly ill used, so that it is difficult to say what it means. If we take argillaceous schist as a type, it means a rock homogenous in structure or in the composition of its parts, which has the property of *drawing* into laminæ. Then we have no other kind of schist, but granite in India, and quartz rock in Norway, which Boase (page 79) tells us "separates into very large plates, several feet in length, and only a few inches in thickness like marble tables." Schistous hornblende will be unknown, and mica or common talc may be considered schistous. Gneiss is scaly in structure, in the same way that mica slate is—to this structure the term "foliated" might be applied. The term "porphyry or porphyritic" might be used as Dr. Macculloch defines it, "crystals of one mineral embedded in a continuous mass of another." We might then say hornblende in felspar porphyry—and dropping the proposition "hornblende felspar porphyry"—then we have "red in white felspar porphyry"—"quartz felspar porphyry"—"felspar quartz porphyry," or crystals of felspar embedded in a paste of compact quartz—all of which are found in India.

For the last two years, I have been engaged in a geological and mineralogical examination of the Salem district, and I find many discrepancies with the theories of European geology, which it will require much labour and assistance to clear up. In Dr. Boase's work, I find many points of agreement between the geology of Cornwall, and Dr. Macculloch's description of the Scottish Isles, with that of India, which are therefore quite at variance with the prevailing system. In the pursuit of my object, I have examined a tract of country in a triangular shape, included between Trichinopoly, Bangalore and Vellore, of which the district of Salem alone contains 7,000 square miles, equal to one-sixth of the area of Great Britain. In this tract I find so many new minerals, that I have not yet had time to examine them all, and perhaps it may be impossible for a single individual to make all the chemical analysis required. I find that hornblendic granite prevails over all this tract, that it forms a substratum at depths more or less under the surface, the rivers cutting their beds down to this rock. It occurs above the surface generally in rounded masses, heaped together, the rounded form of which has been generally attributed to decomposition, but which is not the case, the shape being original; in which way it is found embedded in friable gneiss, or kaolin earth, which fill the interstices between the blocks, and are washed out on exposure to the weather. Black granite (hornblende rock or primary greenstone),

and also trap, are found in the same way. The hollow of the valleys between the ridges of granite are filled with irregular beds, of generally friable rocks of pegmatite, porphyries, hornblende slates, quartz rock, of which the porphyritic is the prevailing structure. The surface of these beds is singularly level, and is covered generally with soil formed from the disintegrated, and decomposed rock. Micaceous granite is very scarce, or occurs only as a variety of the hornblendic gneiss, as a formation, is unknown, and occurs either embedded in the granite or as filling the interstices between its blocks. What has been called gneiss, is hornblendic granite with a concentric lamellar structure, which is a prevailing structure in the granite formation. The formation of which the Palicondah hill is a type, called sienite by Dr. Benza, is a common variety of granite, it forms the hills of Amboor, of Congoondy, and the hills between the Cauvery, and Collegaul in Coimbatore. It is felspathic, and yields easily to the decomposing power of the weather; it has no cleavage, and contains generally much mica, in veins or patches, and trap dykes prevail in association with it. It is characterized by its appearance, which is that of a craggy granitic mass, covered nearly to its summit by a conical heap of large grained reddish gravel. A spheroidal or concentric lamellar structure is common in the masses of globular trap, which causes them to peel in pieces like bits of a rusty shell; this structure is original, and is in no way affected by the action of the weather. The hills and masses of black granite and trap occur as portions of the granitic formation, and can in no way be considered as accidental concretional varieties. Masses of hornblende felspar porphyry occur embedded in granite, proving thereby their *prior origin.* Argillaceous soils in Europe are generally attributed to diluvial or alluvial action, but in India they also occur as original primary formations, connected by veins with the subjacent rocks, and embedding masses of granite in situ, as shewn by veins of quartz intersecting both rock and matrix. The formation of this kind, prevailing at Bangalore, which may be called the Bangalore clay, is an immense and extensive tract of an indurated argillaceous sandstone, which something resembles (as I am informed by Mr. Burr) the new red sandstone of England: it lays immediately upon the subjacent granite, into which it graduates. I have omitted to mention, that basalt also occurs in hornblendic granite, not as dykes, or veins, but as an integral component part of the rock, and in what may be called "lenticular" veins in the middle of the blocks. It will be easily seen how irreconcilable some of these observations are with prevailing theories, and, it is to be hoped, that we may, in future, find theories laid on the shelf a little, and allowed to take care of themselves, while observers will confine themselves to a minute, and accurate examination, and description of nature. I cannot close these

remarks, without acknowledging the great assistance I have received in these labours from Dr. W. Gilchrist, of Hoonsoor, and regretting that his state of health has prevented his making public his own observations on that part of the country. To Mr. W. Burr also I am indebted for several valuable hints, which his great practical knowledge of the science in England have enabled him to offer in a late conversation.

Since the above remarks were composed, the 25th No. of the Journal has come to hand, with the Editor's remarks on some errors of Dr. Benza's which I have pointed out. It was by no means my intention to point out, or to prove, the errors of any particular individual, but to shew the disadvantages arising from neglecting the chemical composition of a mineral. To shew this practically, I selected those errors committed by Dr. Benza, whose well known practical information, might be supposed to preserve him from such mistakes. As it would weaken the force of my argument to allow that the rock in question is so plainly not hornblende, I must remark, that my specimens which are broken from the basement of the pillars of the old durbar, would defy the most experienced mineralogist to say what the composition of the rock is. The colour is exactly the same as hornblende rock, the fracture is granular, the structure granitic, and it in no way resembles any variety of steatite. On referring to No. 12 of the Journal, page 13, it will be seen that Dr. Benza by no means examined the rock carelessly, for he most minutely and correctly describes the character of the *fracture* of the rock, and I must confess, that the only character of the rock which led me to guess it was not hornblende, was its brittleness, while toughness is a characteristic of all hornblende rocks.

I was not aware when I pointed out the mistake about the rock, that Lieutenant Newbold has anticipated me in the remark. The Editor in his remarks affords an instance of the incorrect manner in which mineral names are sometimes applied. He remarks that the rock is plainly a species of steatite. Now, some of the characters of steatite are softness—is easily scratched, yields to the nail, feels greasy, is pulverized with difficulty, and contains little iron; while the rock in question possesses *opposite* characters to every one of those enumerated. Regarding the eurite, I must allow that I chose a bad example; but from the tenor of the former remarks, it will be easily seen that the point is not worth contending. In the third remark about the silicious schist, the Editor affords an opportunity of shewing the disadvantages of not defining mineralogical characters. Granite in India is often schistous; it is silicious, therefore it is silicious schist. If its granitic character is advanced, we will take the lamellar quartz rock of Norway, alluded to before. This then is a silicious schist. But, the being *silicious* cannot be considered a distinguishing character of any mineral; for there is

hardly any rock which does not contain more silex than any thing else. Among the conflicting definitions of writers, it will be easily seen that the term silicious schist or flinty slate is intended to distinguish a tough and hard silicious variety of argillaceous slate, and therefore it will be a silicious schistous rock, containing alumina and iron, while hornstone is almost pure silex. The rock which Dr. Benza calls silicious schist, is almost pure silex, is not at all schistous, contains no iron, and no alumina, and instead of being dark coloured, Dr. Benza himself—Journal 12, page 20—compares it with the *eurite* of Pallicondah hill. The schistous character alluded to by the Editor in his remarks arises from the smallness of the specimen. The rock is massive, and in beds of irregular thickness embedded in friable gneiss, as Dr. Benza correctly describes them; but the masses are divided by a series of irregular joints, which sometimes meet at an angle of about 60 degrees, and it is the flat surfaces produced by these joints that have been mistaken for a schistous structure. This separation by joints, dividing the most friable rocks into flat surfaces, as smooth as if cut by a knife, the planes of which divisions are at irregular angles with each other, is a peculiarity in Indian rocks which I have neglected to allude to, and have not space to describe, but which I have never seen alluded to by observers.*

VI.—*Sixth Report of progress made in the Examination of the* MACKENZIE MSS., *with an AbstractAccount of the Works examined.—By the Rev.* WILLIAM TAYLOR. (*Continued from last No.*)

A.—TAMIL.

a. Palm-leaf manuscripts.

1. *Brahmóttara-cándam*—the concluding section of the *Brahma-puranam,* No. 10—Countermark 16.

Invocation to gods, and poets. The subject of this *purana* was delivered by *Vyasa* to *Suta,* and by the latter to the *rishis* in the *Naimisara-vanam.* Some notice of that *vanam.* At the request of the *rishis* the said *Suta* narrated a variety of matters connected with the *Saiva* system. 1.—The five letters. These are a symbol of the deity; securing the greatest benefits from the repetition of the formule. Illustrated from the story of a king of *Mat'hura.* 2.—The excellency of *Saiva* shrines. Illustrated by the story of a king of *Ayodhya,* who was

* See note at the end of this Journal.—EDITOR.

driven from his throne, and caused to become a *rácshasa.* The legend of *Gokernam* is included, as relating to that king, who went thither, and was there relieved of his *Brahma-hatti,* or afflictive visitation. 3.—The excellency of the *Siva-rátri,* or night of *Siva.* Illustrated by a story; the sequel being, that a *Brahman*-woman committed the heinous crime of killing a calf, and eating its flesh. Dying from the effects, she went to the lower world, and returning was born as a *Chandála.* In this state she suffered great distress from want of food, and going to *Gokernam,* when the place was visited by pilgrims at the festival of *Siva-rátri* she cried aloud for food. Some one put a *vilva* leaf into her hand, and bid her eat it. To her surprise an image appeared in her hand, which she worshipped; and, by the merit of this homage, on the *Siva-rátri* her form was changed, and she was taken to *Cailasa.* 4.—The virtue of paying homage to the emblem of *Siva,* on the *Siva-rátri.* Marvellous effects are related; such as a dog, killed at that time, being born as a king; a dove that had taken refuge in a fane, being killed by a vulture, at that time was re-born as a king's daughter. Other similar details. 5.—The excellency of the *Sani-pradosha,* or certain especial homage on Saturday, of only occasional recurrence. Illustrated by a story of *Chandra-sena,* king of Ougein, who was so exemplary in the worship of *Siva,* that his fame, as a devotee, spread to other countries, the kings of which considered that such a one could never be conquered by them; in consequence of which they cultivated friendly relations, and always took leave of him with great attention and deference. 6.—*Pradosha mahatmya,* the value of the first part of the night. A king assaulted by enemies left the act of homage half unperformed, and went forth against them. He was defeated: his wife fled, and was delivered of a child on the bank of a river. These, and following calamities, proceeded from the negligence of the said act of homage. 7.—The same subject continued. The aforesaid child recovered its father's kingdom, attended to all requisite duties, and conquered the kings of many other countries. 8.—The excellence of *Soma-varam,* or Monday. *Chitra Verma* had a daughter named *Simanti* born as the result of penance; but the astrologers declared that, at an early age, she would lose her husband by death, which took place. A visit to *Yama's* world; a return thence; and subsequent prosperity are contained in the legend. Its purpose is to enforce the value of homage paid on Mondays, at a shrine of *Siva.* 9.—A continuance of the same subject. Further illustration by a tale of a *Brahman* of the *Viderbha* country. He had two sons who went to the king of that country to seek a livelihood, when the said king pointed out to them *Simantri*

a neighbouring queen of **Nigarsha-desam*, advising one of the two to put on woman's attire. They accordingly went, one being so disguised, but *Simantri*, discerning the fraud, pronounced the doom of always continuing in that way degraded. The other son returned; and the father becoming acquainted with what had occurred went to the king of *Viderbha-dêsam*, and reproached him for teaching such a fraud, who referred the matter to his counsellors. These taking into consideration that the *Brahman* had always been an exemplary worshipper of *Siva* on Mondays, advised him to perform special acts of homage, which he did, and by the favour of *Siva* had another son born to him, whence the efficacy of homage to *Siva* on Monday, is deduced by inference. 10.—The excellence of the *Siva-yogya* (or ascetic *Saiva*-devotion). A Brahman, being wealthy, allowed himself the use of animal food, and irregular intercourse, for which he was reproved, and set right by a *Siva-yogi* (or *Saiva* ascetic). At a subsequent period the Brahman dying became a fœtus in the womb of a queen; and great difficulty and agony occurring at the time of birth, the king and queen went out into a forest, or wilderness, where a dead child was born; but a *Siva-yogi*, coming by, put *Vib'huti* (or sacred ashes) on the child; which opened its eyes, and was delivered alive to the mother, who greatly rejoiced. The ascetic announced that the child would be a powerful king; and, wishing prosperity, departed. Hence the estimation in which a *Saiva* ascetic ought to be held is rendered apparent. 11.—The instruction of *Bhadrabahu*, the said child. It relates to the teaching of the child warlike exercises, and accomplishments. 12.—This section relates some exploits of the said young man, and his receiving instruction in some *mantras* from *Rishabha-yogi*. 13.—The marriage of *Bhadrabahu*. 14.—Has a reference to section 9, the said *Sumantri*, in another birth, being it seems the bride of *Bhadrabahu* in this one. 15.—The excellence of the *Vib'huti* or *Saiva* ashes. 16.—The mode of preparing those ashes, and of using them; whereby all sins are removed. 17.—The tale of a *Vedar* or savage hunter, who obtained beatification by the worship of *Siva*, whence the excellence of that worship is inferentially deduced. 18.—The section of *Uma-isvara*. It refers to the death of a *Brahman*, by the bite of a serpent, and to certain directions given by a sage, as to the worship of the said form of *Siva* and *Parvati*. 19.—Story of *Sarati* a *Brahman* female (on the principle of the metempsychosis) who was falsely accused, and delivered by the interposition of a celestial voice. Her discovery of her husband at *Gokernam*, at the *Siva-rátri* festival, and great happiness afterwards. 20.—Excellence of the *rudracsha* beads. A king obtained *Cailasa* by

* Sanscrit *Nishada*.

wearing them. The story of a monkey re-born as the son of a minister of state. 21.—The excellence of the *Rudra-mantra.* Illustrated by a story relative to *Cashmir.* 22.—The merit of hearing this *puranam.* The sins of such will be removed; they will obtain all that they desire; will escape from *Yama ;* and obtain many other advantages. A description of the torments of *Yama's* world, is given, from the narrative of a *Pauranica-Brahman.* These punishments are of gross crimes; and the fear of that punishment is obviated by hearing this *puranam* recited.

Remark.—It has more than once met my observation that degrading, and depraving, as is very much the tendency in all *Hindu* books, those of the *ultra-saiva* kind are peculiarly so. A very brief indication of the contents of the preceding manuscript is given ; a full translation would illustrate the above remark ; further detail on which point is needless. The book is complete ; and very recent in appearance : it remains quite uninjured. It is stated to be a production of *Vara-tunga Rama Pandiyan ;* to be understood of a poetical version, in Tamil, ascribed, or dedicated, to him. From that poetical version, this one in plain prose, was made by some writer unknown. The original Sanscrit is said to be the concluding book, or portion, of the *Brahma-puranam.*

Note.—It it entered in Des. Catal. vol. I. p. 166. art. xi. as "a translation of a division of the *Skanda Purana.*" The like definition of two Sanscrit copies, bearing the same title is given at p. 51. The *Scanda puranam,* has much referred to it, generally, which is of doubtful origin.—I would not determine ; but am told that the aforesaid M.S. is part of the *Brahma-puranam* ; and the title which it bears within itself, as well as on the label, certainly implies the same.

2. *Tirupachur St'hala puranam,* legend of Tripassore, No. 39—Countermark 43.

This is a legend of a small fane, written in verse of the *Viruttam* kind, and consisting of 595 stanzas, divided into seventeen sections ; each section containing a tale as usual ; but not of any consequence. The situation is 32 miles W. of Madras. The outer-workmanship of the shrine, I have remarked to be superior, and with an appearance of some antiquity. There are also remains around the place, at some small distance, in a different style of architecture from any thing now customary. The fort caused this place to become of consequence in the modern wars, and convulsions, of the peninsula.

Note.—It is briefly entered in Des. Catal. vol. i. p. 173. art. 28.

3. *Nita Venpa,* a moral poem, No. 177—Countermark 192.

The *Venpa* is a stanza of peculiar, and elegant, structure. Out of one hundred of such stanzas, this manuscript contains seventy one. The following is a brief indication as to subject. Those who are great are to be cultivated, and honoured; by doing which advantages are acquired: the ignoble or the mean, are not to be attended to, as nothing can be obtained from them, but trifles, or degradation. Illustration; if any one look into the den of a lion he will get the ivory tusks of elephants; but if he search the den of a jackal, he will only find an ass's skin, or sheep's bones. Things even change their character according to usage; as an osier-bamboo may be wound into the structure of a kingly coronet; or, if left to grow old, may become a rope dancer's, or mountebank's pole.

Note.—The book appears a little old, and is slightly injured by insects; though not at present seriously.

It is entered in Des. Catal. vol. i. p. 231 art. 61.

4. *Niti Venpa* (no distinguishing mark or number).

This is another copy of the above work, on very ordinary palm-leaves, without covers, or other similar mark of belonging to the collection. It has a deficiency of fourteen stanzas, and by its assistance the chasm in the other copy may be partially, though not wholly, filled up. To edit the work satisfactorily a third copy would be required.

Nyána sampantar Puránam, or legend of *Sampantar*, No 44—Countermark 88.

This production seems to have formed part of a larger book. The leaves are numbered from 150 to 256, and a single leaf, a fragment, of another subject, follows. The book contains 1253 stanzas, on the life and actions of *Sampantar*, the famous champion of the *Saivas* against the *Bauddhas* at Madura, in the time of king *Kúna Pandiyan,* afterwards named *Sundara Pandiyan.* The story has appeared in my abstract of the Madura *puranam;* and also in various preceding papers of these reports. It is needless therefore to enter on it again.

The manuscript is old; touched, to a trifling degree by insects, and otherwise injured rather more seriously by the breaking of a few leaves, by reason of decay.

Note.—It is entered in Des. Catal. vol. i. p. 203. art. 19.

6. *Niti Sára anubava trattu,* a moral poem, No. 179—Countermark 194.

This is a poem in the *Cavyam* metre, synonymous with hexameter, or heroic, measure. The general subjects are the following :—

1. The nature of mankind, or of the human species; describing their qualities, or dispositions; and the way in which they ought to walk, or to conduct themselves.

2. The way and power of virtue: time, fitness and circumstances are to be noted; and, according thereto help or beneficence, to be extended to others.

3. The nature of rectitude. If people during the whole of their life observe perfect rectitude their beatification will be assured.

4. The nature of iniquity, or the opposite of rectitude. If any one do not assist others, but rather do them harm; if any one bear false witness; if any one swear falsely to the hurt of others, such courses are the opposites of rectitude.

5. The conduct of a king. If a king do not molest his subjects, but hold an equitable sceptre, such a one will attain a high future reward.

6. The way of rectitude. A king must know the four modes of "concord, division, tribute, war;" and by means of them conduct the affairs of his kingdom.

7. The way of irregularity; some reasons are given to shew that a king ought not to associate with the bad, nor yet to molest the good: such associations, and such molestation being contrary to equity.

8. Upright and moral persons should zealously cultivate the favour of the one true God. The worship of images, or multiform gods, is throughout the work discouraged, and more or less distinctly reprobated.

9. The human body constitutionally or physically considered, with reference to its healthy state, tendency to morbid affections, or positive disease.

Note.—This manuscript is complete, and of recent copying; slightly touched by worms in one or two places; but not at present of consequence. The book seems to me rather special, and as I conjecture is the production of some of the *Jainas* of olden date. There are several such works which I have long wished to see well edited. In any such series, this poem should find a place.

It is entered in Des. Catal. vol. 1 p. 232. art. 63.

7. *Aranjesvara Venpa*, No. 182—Countermark 199.

8. Same title, No. 184—Countermark 200.

9. Ibid, No. 185—Countermark 201.

This work contains a series of illustrations of the Cural of Tiruvalluvar. The plan made use of is to quote a sententious maxim from the *Cural;* and then to prove its accuracy, by an example taken from other works of reputation: the illustration is usually practical, being of the nature of a historical or biographical, incident. The tendency of such a plan is to engraft both moral remark, or precept, and practical illustration, on the memory. If well and impartially managed such a model might be followed in other languages.

No. 182 wants 22 leaves at the beginning, the stanzas, with their prose explanation are in regular order from the 23d stanza to the 56th, but the remainder is wanting. The last leaf is greatly damaged; the others in good preservation.

No. 184 contains 75 stanzas, complete from the beginning, and the writing is then discontinued; evidently from the copyist not finishing his work. The manuscript is of recent appearance; but has been a little injured by insects, especially at the beginning.

No. 185 is complete from the beginning down to the 58th stanza; the rest is wanting, owing to some leaves having been lost. It is uninjured by insects.

NOTE.—These copies are entered in the Des. Catal. vol. 1. p. 245. art. 68, according to that entery there should be two other copies. These I have sought for through the collection, without finding them.

10. *Tiruvannamali-koil-kyfeyat*, account of the fane at Trinomallee, No. 221—Countermark 60.

This brief manuscript, in the former portion, is merely an epitome of several sections of the *St'hala-puranam*: narrating the stories in a very compressed form; and having especial reference to the *ammen*-shrine, which commemorates the victory of *Durga* over *Maheshasura*. Further on, there is an account of the circumstance which led to the employment of a low class of fishermen, who annually ascend the hill to light the large column of combustible matter, prepared as a *homam*, or offering by fire. They were chosen to this office, from their great ignorance,

and recklessness of character. A sort of trick is practised in the lighting the said column; so as to induce people, unacquainted with the secret, to consider it to be miraculous, because it always occurs instantaneously at the very moment when the lamps are lighted below, effected by contrivance through the said fishermen, and by signal. It is added afterwards that when *Vira Sambhuva rayer* ruled, the *Chola desam*, he enlarged the fane by various additions. About 700 years since a *Vallāla* king, said to have ruled over the *Tuluva* country, came hither, and felt a desire to live at the place; but as its sacredness forbad the doing so, he built a town at some distance, and resided there. A vile story follows of *Siva* appearing under the form of an old *Pandáram*, and acting a part very unworthy of a god; but the story, however debasing to the object of their worship seems very pleasing to his votaries, as it is found in at least three books with reference to different kings, or chiefs in various places. The *Vallāla* king afterwards accomplished great conquests. The *Rayer* dynasty subsequently made additions to this shrine. The Mahomedans, when they acquired power, manifested much complacency towards this shrine; and gave it some grants and immunities. The manuscript adds that the Honourable Company follow the like method of proceeding.

Note.—This document is complete. It is somewhat damaged by insects; but, as yet not seriously. There is nothing in the document of consequence; unless a complete exposure of the folly, and stupidity, as well as criminality, of idolatry be so considered. Appended is copy of an inscription taken from the wall of a building erected by *Vajranga Pandiyan* It is dated Sal. Sac. 1283 (A. D. 1361), and commemorates the gift of some land to the place by *Cumara-Campanra-udiyar*, son of *Vira Bukha-Campanra*, of the family of *Harihara-rayer*. (This *Campanra-udiyar* it will be remembered performed an office of consequence in expelling the first marauding inroad of Mahomedans from the extreme south. This inscription therefore is of some interest). The manuscript is in good preservation.

I do not find it entered in the Des. Catalogue, and it has not the usual marks of classification, though the other Nos. are not wanting.

10½ *Tiruvannamallai-guru nama-sivayi kyfeat*, or account of *Nava-sivayi*, a *Brahman* of Trinomallee, No. 248—Countermark. 101.

This a production of the class of writing heretofore more than once adverted to, in which prose is mingled with verse; the former being,

in this instance, little more than a vehicle for the latter. *Namasivayi* is represented as uttering a long train of *venpas,* a sort of brief sonnets, if I may so render the term, expressive of some supposed excellence of some particular portion of the fane, at Trinomalee, and the *ammen,* or goddess, pleased with the strain, uniformly grants every part of the requests which are made. The production exhibits the puerility of idolatry, to a striking degree. The intention, however, of the book seems to be to magnify the said *Guru,* as one extraordinarily favoured by the local *numina* of the shrine.

NOTE.—The document is complete in twenty palm-leaves, which are in moderately good preservation; though a little touched by insects. Two leaves are appended, containing an account of succession by hereditary descent of a *Pandáram,* of the said fane of *Trinomali:* of no importance.

The M.S. is entered in the Des. Catal. vol. 1. p. 207. art. 30.

11. *Tanjavur Candiyur-Isvara koil-sila-sassanankal,* or inscriptions on stone in the *Saiva* fane of *Candiyur,* in the kingdom of Tanjore, No. 5—Countermark 957, written within.

"The contents are thirty two inscriptions copied out in *Candiyur Tirupanturatti, Coil patti-tillistanam, Caduvuzi, Carunta pattankudi.*"

According to the number of the leaves, there are 95 palm-leaves wanting; though the number of inscriptions, that is 32, is complete; answering to the above title, written within on a blank leaf in a different hand-writting. It is therefore uncertain whether what may have preceded was taken away or lost; but some similar books in the collection render it probable that this is one section of a continued series.

No. 41. In the *Saiva* fane at *Candeyur,* dated 17th year of the rule of *Kó-raja-Cesava-Maharaja,* gift to a fane at *Satya-mangalam.*

No. 42. Dated in the 10th year of *Kopa-deva;* but the other words and letters are so evidently incomplete, and disjointed, that the inscription could not have been legible on the stone.

No. 43. Dated in the 11th year of *Kó-raja Kesari,* the name of *Tiru Candeyur* is legible; nothing else.

No. 44. Inscription on the shrine at *Tirupantirutti* of *Pushpavanesvara-svami;* name of the goddess *Savuntira nayak ammen.*

Dated Sal. Sac. 1346, in *Crodhi* year: gift by *Vijaya rayen,* of the race of *Harihara rayer* of a certain portion from the revenue arising from cultivation.

No. 45. Dated in Sal. Sac. 1336, *Manmata* year. Gift of land to the same fane, by some head-men, apparently three in number.

No. 46. Dated in the 10th year of *Korasadaipan Chola dever*; but no intelligible sense can be made out.

No. 47. Dated in the 30th year of *Kiri Konda Chola-dever*; gift of various sundries for offerings or services to a fane; the name of which cannot be made out.

No. 48. Dated in the 20th year of *Kiri Konda Kopa-Kósiya pairam dever Cholan:* gift of land to maintain a constant light in a fane of *'Adi-chandesvara.*

No. 49. Dated in Sal. Sac. 1454, a string of titles without any proper name; that of *Varadapaiyar* of *Krishnapuram* occurs, but this is perhaps that of the local god: gift of a tax on cows.

Remark.—The foregoing is merely a specimen of the contents. They are so prevailingly illegible, from deficiency of letters, as to lead to the inference, either that the said letters were defaced on the stone, or else that the characters were not understood. Considerable pains were taken with this book; without adequate result. The oldest inscriptions appear to have no *Sacai* year stated; and where the *Sacai* year is mentioned, the date is comparatively modern.

The M.S. is entered in Des. Catal. vol. 2. p. 118. art. 5.

12. *Bomma nayak kaifeyat*, account of a Poligar, No. 200—Countermark 96.

13. Same title. „ 221 „ 86.

The first of these documents is in the hand-writing of *Subrahmanyan*, and the other in the hand-writing of *Srinivasaiyan*, both persons being retainers of the house of *Bomma nayak*, whose chief town is herein termed *Carisaputtu-vára-púr*. The subject, and incidents, in both documents are very nearly the same; being an account of the lineage of *Bomma-nayak*. It does not date higher up than the period of *Visvanat'ha nayak* of Madura; among whose attendants the ancestor of this race was one. As the Madura ruler distrusted the people of the south he built a greatly enlarged fort; and one of the bastions was committed to the care of the said ancestor; on whom likewise was bestowed an extensive fief in land, in the neighbourhood of *Sivagangai* and Ramnad. The lineage is given, downwards; without the mention of any thing particular, until the war against Tanjore, and the capture of its capital. Subsequently the mention of marriages, and petty incidents, occur, rela-

tive to other chieftains, and especially those of Ramnad. One of this line went to Tanjore in the time of *Tuccoji*, and *Sarboji*, Mahratta rulers; and distinguished himself, much to their satisfaction, by killing a tiger in single combat. Afterwards the incidents relate to the strifes, and unsettled state of things, down to the assumption of power by the Nabob of Arcot The writers mention the existing chiefs, at the time when the documents were written; and state the desire then felt to obtain the patronage of the Honourable Company.

Remark.—Both documents are brief, and complete. They would merit to be consulted in any particular account of the unsettled, and disorderly period of the Madura government, posterior to the contested succession by *Minacshi*, and *Bangaru Trimala nayak.* This house of *Bomma nayak* subsequently met with a severe fate, after giving much trouble. I am compelled to say I think they deserved it; for by traditionary circumstances, handed down in a portion of my family, I know them to have been among the worst of the *páll'ya cárers* of their day. The incident connected with one of this race in the time of *Tirumala nayak*, has been before adverted to, in the abstract of the Madura *Virapan Ammāni* (see 4th Report).

Note.—One of these copies is entered in the Des. Catal. vol. 1. p. 206, art. xxv.

14. *Divākaram*, a vocabulary, No. 64—Countermark 221.

The work which bears this title is a common and well known vocabulary of the Tamil language, in verse, on the plan of the *Amra côshu*, and *Nigandu*: though not so full. It is ascribed to *Chendal Divákaran*, a follower of *Subrahmanya*.

Of the twelve parts of which this work, when complete, consists, there is in this manuscript only about two-thirds of the first part, on the names of the gods. As regards preservation, the fragment is uninjured.

This manuscript is entered in Des. Catal. vol. 1. p. 252, art. 7. Another palm-leaf copy is mentioned; not at present in the collection.

15. *Slotra agavel*; hymnology, No. 195—Countermark 178.

A few leaves without order, or connexion, and so greatly damaged by insects, and other causes, as to be no longer coherently legible. As far as any subjects can be made out, the contents agree with the title,

indicating a poem of the easiest kind of metre, in praise of various so called deities.

It is entered in Des. Catal. vol. 1. p. 227, art. 43.

b. Manuscript books.

Manuscript book, No. 22.—Countermark 223.

Divákaram, a Tamil dictionary.

An incomplete palm-leaf copy is noticed in the preceding portion of this report. The present copy is complete, in twelve parts, it is written on strong Europe paper, with good ink, and is in perfect preservation.

Manuscript book, No. 10.—Countermark 67, *Calingatu Parani*, a poem on the conquest of *Calinga.*

This is a complete copy of the above mentioned poem; respecting which a notice from a palm-leaf M. S. was given in my fifth report. In this book the seven first sections are found, as therein stated; but the following portion is numbered on, as to verses, without break or division into sections, to the end; comprising in this last portion, three hundred and thirty stanzas, or nearly as much as the entire amount of the preceding seven sections. The palm-leaf copy appears to be the best one of the two.

Note.—This book is in good order, the ink only a little pale; but it needs no further attention. It is entered in Des. Catal. vol. 1. p. 196, art. 5, with regard to which entry it may be observed, that the leading fact of a *Chola* conquest of part of Telingana is beyond question historical; all the village records of the country containing references to it, in a way necessarily implying a foundation in fact.

Manuscript book, No. 22.—Countermark 776.

Section 1. Account of *Chitambaram.*

The paper has, in Telugu, the title of *Chitambara mahatmya;* and is found to be another copy of that portion of the contents of M.S. book, No. 1. included under the title of the local *mahatmya* or legend. It adverts to several *rishis*, and to various matters relative to appearances of *Siva*, needless to be further particularized; seeing that the

legend received full and particular attention in the abstract of the above-mentioned book in my third report.

Section 2. Tales of the four ministers of the king of *Alacâpuri.*

A sufficient notice of these tales before occurred in my fourth report, from a palm-leaf manuscript.

Section 3. *Siva mata-sastra,* or the book of the *Saiva* sect.

Details of places where there are *Saiva* fanes, and mention of hierophants, and ascetics. The peculiarities of the *Saivas* are stated; as also the four distinctions under which they rank all votaries; together with notice of the rites, both simple and symbolical, which they are accustomed to perform, with regard to their emblematical figures, or images. A list is added of books, specially appertaining to the system of the *Saivas.*

REMARK.—This book, as to binding and paper, is in good preservation. The ink only is in some places faded. The latter part, so far as relates to the *Saiva* worship, is the only portion that could be considered of the slightest consequence.

Manuscript book, No. 20.—Countermark 260.

Cappal sastram, or art of navigation.

This book contains three subjects—the *Cappal-sástram*; the *Silpi-sastram*; the *pancha pacshi-sastram*: astrology predominates in the two former.

1. The *Cappal-sāstram.* There are some directions concerning the mode of building ships, and the proper time of doing so. The suitable times for sailing are stated; the observation of the stars and lunar mansions is enforced with reference to every thing; even to the dropping of an anchor, which must be only as the stars ordain; and so for the remainder.

2. The *Silpi-sastram.* Directions for laying the foundations of houses, and other buildings, and raising the superstructure. Astrology is mingled up with the other matters; and in this art is evidently of commanding influence.

3. The *Pancha-pacshi-sastram.* This is a most fanciful system. Five different species of birds are arbitrarily nominated, and certain actions, such as sleeping, walking, &c. ascribed to them. Particular

divisions of the day and night are attributed to them; and as these follow in various alternation, so different actions of the birds correspond with different periods of the day and night. Some of these actions are fortunate; some the reverse: consequently it requires both labour and skill to discover what bird rules the hour, and whether the action of the bird at the time is propitious, or adverse. If adverse, nothing must be done just then. This artificial system, I have understood, is not generally received. One more preposterous it would be difficult to imagine. This last part is incomplete.

Remark.—The book is generally in good preservation, the ink a little pale, but at present nothing further is requisite than moderate care.

Manuscript book, No. 14.—Countermark 155.

Section 1.—*Paramart'ha Guru.*

A sarcastic series of tales by *Beschi*, levelled at heathen *gurus;* and intended, at the same time, to assist in learning familiar phrases in the Tamil language. It was translated by Mr. Babington. The above copy is complete.

Section 2.—*Agastya varalāru.*

An extract from the *Cāsi Cāndam* of the *Scanda puranam;* heretofore given in an abstract of that book. Vide 5th Report.

Section 3.—*Jati-vallamai.*

A tract on differences of caste, written by *Veda Nayak,* a Christian in Colonel Mackenzie's employ.

Section 4.—*Jāti béda nūl.*

The poem of *Ulaga nát'ha*, heretofore noted (vide 4th report). The subject is, the differences, and distinctions, of castes, or tribes.

Remark.—The contents of this book are in very good preservation The different sections are entered, under distinct heads, in the Descriptive Catalogue.

B.—TELUGU.

a. Palm-leaf manuscripts.

1. *Vira bhadra vijayam,* or the triumph of *Virabhadra*, No. 69.—Countermark 321.

2. Another copy, No. 70.—Countermark 467.

Both of these manuscripts are complete copies of a poem in the *Padya-cávyam* measure, relative to the destruction of *Dacsha's* sacrifice by *Vira Bhadra,* produced by the anger of *Siva* in consequence of the death of his wife. The narrative was heretofore given in the abstract of a part of the contents of the *Bhágavatam,* rendering enlargement needless; indeed the story is popularly well known. This work is the production of *Bommana-pota raja,* or more briefly *Potaiya*, an author of considerable eminence. Both copies are in good preservation. The manuscript No. 70, has the appearance of being the oldest of the two.

Note.—One copy is entered in Des. Catal. vol. 1. p. 348. art. 68.

3. *Ramabhyudaya,* or the fortunes of *Rama*, No. 98.—Countermark 292.

This poem in the *Padya-cavyam,* is by *Ramabhadra cavi* who, by one account, is said to have flourished in the reign of *Crishna rayer.* This poem was his principal work. It contains an abstract of the general subject of the *Rāmayana.* The lamentation of *Rama* on the loss of *Sita* is, by some, considered to excel in pathos. This copy is exceedingly imperfect; many palm-leaves being wanting. What remains is in good preservation.

Note.—It is entered in the Des. Catal. vol. 1. p. 334. art. 46; and is, stated to be "by *Ramabhadra-kavi* of *Uttanutta,* dedicated to *Nrisinha raja* of *Gobur.*" I do not know that there is any real discrepancy between the two accounts as to the author.

4. *Sri Calahastri-mahatyamu,* the legend of *Calahastri*, No. 76.—Countermark 22.

It is otherwise named *Yadava raya-charitra.* The contents are of the usual character, in such legends. *Siva* is said to have assumed the form of a *Jangama* ascetic, and to have related to a king of the *Ya-*

dava race, the origin of the image at this place; and the excellence of the shrine, as illustrated by various tales of devotees of *Siva,* who in consequence obtained union with his form, or beatification.

The book consists of a larger manuscript in the *Pádya-cávyam,* containing the legend which is complete; and of a smaller book containing a brief abstract in Telugu prose; being a summary of the contents of the poem. The whole is in good preservation.

NOTE.—The M.S. is entered in the Des. Catal. vol. 1. p. 277 art. 20.

5. *Vasu-charitra,* or tale of *Vasu,* No. 31.—Countermark 459.

This is a mere fragment of an elaborate and celebrated work, composed by *Bhatta Murti;* one of the eight celebrated poets at *Vijayanagarum.* It is in the *Padya-cávyam;* and is said to have been much admired, and made a model by later poets. It was written after the capture of *Vijayanagarum,* and under the patronage of *Timma raja* of *Pennaconda,* son of the ill-fated *Rama raja,* last of the *Vijayanagarum* dynasty, and elder brother of the two rulers at *Chandra giri* and Seringapatam. It should contain six *asvasas,* or sections; the genealogy of *Timma raja* being given at the commencement. The subject of the poem is a love-tale relative to *Vasa,* a king's son, and his marriage with *Giri-canyaca,* a mountain nymph, with the usual filling in of description, and metaphor.

At the beginning three leaves are broken in two, and the halves are lost, the 9th, 10th and 14th leaves are in the same condition. For the rest the first section is right. There is only about a quarter of the second section, and the entire remainder is wanting. The loss is not very material, as the poem is not scarce; but the passing off, this and many other fragments, on Colonel Mackenzie, as if complete manuscripts, certainly was a grave fault, on which it is superfluous to enlarge.

NOTE.—The book is entered in Des. Catal. vol. 1. p. 341. art. 62, but without any note of deficiency; which moreover is not usually given in the Catalogue; from the compiler of which, the deficiencies in MSS. seem to have been concealed.

6. *Retta-Matam,* or system of *Retta,* No. 108.—Countermark 493.

7. Same title,......................No. 109.—Countermark 495.

8. Ibid,......................... .....No. 110.—Countermark 494.

One half of the first of these manuscripts consists of a fragment (of about 50, palm leaves) of the tale of *Svarochisa-manu,* by *Allasani*

Peddana, the famous Telugu poet (see the notice of that composition, 5th Report B. Telugu, No. 12). This fragment is old; has one or two leaves broken; and insects had begun to glue the leaves, preparatory to their work of destruction; but have been interrupted. It may be set aside previous to adverting to the other contents.

The *Retta-matam* properly consists of six sections, of which No. 108, contains five complete. It is old, two or three leaves are broken; others glued by insects; and a work of destruction was begun; though not carried on to any material extent. No. 109 has two leaves prefixed, containing praises of *Vishnu*, as *Ráma*; and there are five sections of the *Retta-matam* complete, with a few leaves of the sixth, but the remaining portion of that section is deficient. It is a comparatively recently written book: notwithstanding which, it has a leaf or two, broken, and others slightly punctured by insects. No. 110 is a small portable pocket sized book, containing selections from the astrological portions of the work, concerning eclipses, and the influences of "the nine planets." It seems to have been copied out only a few years since; and is in perfect preservation.

The introduction to the *Retta-matam*, contains some eulogy of *Vencata-rayen*, being the ruler of *Chandra-giri*; and younger brother of *Timma-raju*, of *Pennaconda*. *Ayalu-Bhascara*, being present in his court, was asked to narrate some poem, with which request he complied, by translating, from the *Hala Canada* language, the work of one named *Retta:* the leading topics of this translation are,

1. On the causes inducing the production of rain.
2. On discriminating the value of produce from the earth.
3. On divination, by signs, tokens, &c. on the *Hindu* system.
4. On augury, or divination by birds.
5. Concerning *Dhútas*, messengers, familiar spirits, or demons, supposed to reside, like hamadryads, in trees; sometimes in fanes, old houses, cross-roads, &c; and considered to have the power of speech, sometimes with visible appearance, sometimes without, and indicating good or evil to the human beings addressed. The agency of this class of supernatural machinery is frequently adverted to, in *Hindu* books.
6. Portents, or indication of clouds, as to rain.
7. Indication of rain by an aerial sound, preceding its fall (an observable phenomenon in heavy tropical rains).
8. On the qualities, or excellencies, of learning.
9. On the rainbow, or fabled bow of *Indra*.
10. On lunar haloes, as an indication of rain.
11. On the rising of the sun, and consequent effect on the wind.

12. On the origin, birth, or generation, of the human species.
13. On the pouring out, or oblation, of water, in ritual devotion.
14. On the effects, or influences, of eclipses.
15. On sudden, or unforeseen, events; especially sudden deaths.
16. On unpropitious events, or evil results, of planetary influence.
17. The nature of opposition of planets, and results.
18. The propitious result of favour from a spiritual preceptor.
19. The influences, or powers of different years of the *Hindu* cycle.
20. On good and bad days; or those propitious, or unpropitious.

These varied contents are distributed among the several sections; not regularly, but according to the extent or quantity: for example, one complete section is occupied with the subject of rain, while other sections contain several subjects.

Remark.—Observations which I have elsewhere made as to Hindu astrology, apply I conceive, to this book, as well as to others at different times noted.

The three copies are entered in Des. Catal. vol. i. p. 356, article 1.

9. *Amukta-mâla*, a poem, No. 25.—Countermark 340.

10. Another copy, ... No. 26.—Countermark 341.

11. *Amukta-málu vyác'hyánam*, No. 27.—Countermark 342.

The two first manuscripts are copies of a very difficult poem by *Allasani Peddana*, which was written in the *padya cávyam* metre, and so abstruse that some say he himself wrote the prose explanation contained in No. 27, in order to render his poetry intelligible, even to other poets. In the early portion there is a reference to mythology of the *Vaishnava* kind, and to *pauranical* history. The lunar race is given, and by the medium of the *Tuluva* country the line of *Narasinha rayer*, and *Crishna rayer* is panegyrically narrated. The latter was the poet's patron, and has herein an epithet given him, as being the *Vira Bhadra*, who conquered the fort of *Condiviti*; also giving the credit of the work to him, by inserting his name as the author. It is then observed that the special object of the work is to narrate an account of the ascendancy of the *Vaishnava* system at *Sri-vili puttur*, in the ancient *Pandiya* country. A *Pandiyan* king of early times, being embarrassed on the subject of religious differences, assembled votaries, some of whom told him he ought to worship *Siva*, some said *Brahma*, some said *Agni*, some said *Vayu*; and so on. Thereupon *Vishnu-Sid-*

dhar, a Brahman of *Sri-vili puttur* publicly disputed in the king's presence, with the votaries of other systems; confuted them; carried off the prize which the king had appointed as the reward of the successful disputant; and converted the king to the *Vaishnava* faith: who consequently built shrines and fanes, especially at *Sri-vili puttúr*. At a later period one named *Yamanácharyar*, of the same place, in like manner overcame in a polemical discussion, and by the *Pándiya* king of the day was rewarded very munificently. The work then adverts to the history of *Crishna*, with a profusion of poetical ornament, concerning the *Gopis;* and expatiates on the excellence of his shrine at *Vili puttur*. A remarkable story occurs: a *rácshasa* (or savage) having caught a *dási*, or female slave of the fane, purposed to kill, and eat her (another trace of cannibalism in the South of India), to which the *dási* made up her mind; but begged permission first to relate some stories. She drew on her knowledge in order to narrate the Hindu account of the origin of the world, mythology, and the like; with such marked effect, that the barbarian renounced his anthropophagy; became a convert to the *Vaishnava* system, and had his "vile body" transformed into one resplendent with lustre. Subsequently the incarnation of *Ramanuja* is stated; together with his victories, as a champion of the ultra *Vaishnava* system.

Note.—The manuscript No. 25 is rather old; the palm-leaf No. 13 is broken in two, and one half lost: for the rest the copy is complete, and without damage. No. 26 is somewhat older in appearance than the other. The 42d leaf is broken in two, but neither half lost. The last two leaves are slightly touched by insects. The copy is in all other respects complete, and without injury.

The manuscript No. 27 has four blank leaves wanting, in the fifth section; forming a chasm in the subject: the remainder is complete.

The book is of recent appearance, slightly touched by insects in a few places; but, on the whole, in good order, and preservation.

The three copies are entered in the Des. Catal. vol. 1. p. 318. arts. 3 & 4.

12. *Crishna Arjuna Samvádam*, or the discussion between *Crishna* and *Arjuna*, No. 19.—Countermark 279.

A *Gandharbha* offended *Crishna*, then ruling in *Dwaraca*, whose court is described. *Crishna* being angry, and threatening the chorister's life, it mounted a flower, as a vehicle, and speeded to *Arjuna* for protection. *Arjuna* granted the boon. *Crishna* sent messages, demanding the restoration of his servant, which *Arjuna* pertinaciously refused. The con-

sequence was entire disagreement; and preparations for war. All however ended peaceably; and on a good understanding being restored, the *Gandharbha* was allowed to proceed at pleasure, its life being spared.

Note.—The M.S. is old; a little injured at the outward edges; but not otherwise, and it is complete. It is written in the Canarese character; but the language is Telugu, in the *Padya cávyam* metre. The copy has the appearance of having been made by a person unaccustomed to Canarese writing.

The work seems to be a mere play of the imagination.

It is entered in the Des. Catal. vol. 1. p. 270. art. 11.

13. *Panduranga mahatmya*, No. 39.—Countermark 287.

14. Same title, „ 40 „ 288.

This is a local legend of a fane, composed in the *Padaya cávyam* metre, by *Rama Crishna-cavi*, in the reign of *Sri-rangha-rayalu*, whose genealogy, as patron of the poet, is given. The *puranam* was declared by *Vyása*; by him communicated to *Suta-rishi*, who delivered it to *Savunaca-rishi*. It is divided into 5 sections.

The excellency of *Cási*. The *Brahmans*, and other sages, its buildings, people, and a variety of matters, descriptive of its splendour, and superiority.

2. Account of *Pandurangam*, narrated by *Siva*, to *Parvati*. In very early times *Pundarica*, for his exemplary virtues, was favoured with a visible appearance of *Vishnu*, as *Crishna;* and obtained from him special immunities, and privileges, for this shrine. Some details are given, respecting the different *tirt'has*, or sacred pools, for bathing at this place.

3. Concerning *Calinga-patnam*. Account of a *Brahman* of *Calinga*, whose manners and conduct were extremely bad; but who afterwards, by worshipping, and bathing, at this place, became entirely altered, and finally obtained beatification.

4. Concerning the *Pundarica tirt'ha*. The value of this particular pool, named after the founder of the shrine, and the efficacy of bathing therein, are illustrated by a variety of legendary anecdotes, or narratives, in the usual strain.

5. Narrated by *Sambu-murti*, or *Siva* to *Náreda*. This section relates chiefly to *Crishna* and *Rucmeni*, and its being put into the mouth of *Siva*, is apparently designed to magnify the worship and sect of *Crishna*, to the depreciation of the rival system.

Note.—In the manuscript No. 39, there is a very slight deficiency at the end of the first section; the second section is complete; and of the third section about half is written; the work of the copyist being suspended in the midst of a leaf, and the remainder of course wanting. The book is fresh, and in generally good preservation. A little injury in one or two leaves, by insects, is as yet of no consequence. No. 40 is complete in 138 pages, it is a much older book than the preceding copy; but is nevertheless in perfect preservation.

Both copies are entered in the Des. Catal. vol. 1. p. 271. art. 15.

15. *Sasanca-vijaya*, a tale of the planets, No. 85.—Countermark 408.

This fragment is part of a work framed on a mythological incident, found in the old *Puránas*. *Atri* by his wife *Anasvaya*, had three sons named *Dattatreya*, *Durvasa*, and *Chandra*. The latter going to the mansion of *Vrihaspati*, seduced his wife *Tara*; and *Budha* was in consequence born. *Sucra*, the enemy of *Vrihaspati* suggested this evil course to *Chandra*. The consequence was a terrible war between the celestials under *Vrihaspati*, and the *asuras* of whom *Sucra*, is the preceptor. *Vrihaspati* denounced on *Chandra* the doom of being subject to increase in one half month, and decrease in the other half.

That real persons bore some of the above names is everv way probable. But, for the rest, the story is an astronomical allegory.

Note.—Out of five sections, this manuscript only contains part of the fifth, and that damaged by the breaking of the leaves. It is entered in Des. Catal. vol. 1. p. 338, art. 56, with a brief index; correctly ascribing the authorship to *Vencatapati*, son of *Crishnaiya*. It may be added that he wrote in the *Padya-cávyam* measure.

16. *Patita-pavana Cheritra*, No. 78.—Countermark 389.

This is also a fragment by *Vencatapati-cavi*, son of *Kechana*, or *Crishnaiya*, being the same person as above: the metre used is the same. There are three sections; and three others are wanting. The contents are narrated as if from the mouth of *Válmica*, addressed to the *muni Bharadvaja*. The praise of *Rama-chandra*, as an incarnation of *Vishnu*, is enlarged upon; and *mantras*, proper to the *Vaishnava* system are given. The worship of *Vishnu*, as *Vencatáchala*, his more modern

and popular form in the neighbourhood of *Tripeti*, is likewise eulogized. It is wholly a *Vaishnava* production.

Note.—The appearance of the book is not very old; but it has been rather severely attacked by the book insect; not however, so far at present, as to injure its legibility. It will require, in common with all such books, to be occasionally opened, and exposed to the sun and air. Neglect, damp, and worms, assist the "omnia edax tempus."

The manuscript is entered in Des. Catal. vol. 1. p. 333. art. 43.

17. *Sananda Cheritra*, No. 75.—Countermark wanting.

This is an old book, considerably damaged by wear, and also imperfect, by the loss or deficiency of many leaves. It is an ultra *Saiva* production, by *Singaiya cavi*, of *Calahastri*, written in the *dwipada* measure.

The birth of *Sananda* is described; he became a devotee according to the *Jangama* system, and a follower of *Bassavesvar*. He visited certain *rishis*, or devotees, in a wilderness, and with them went to *Yama-puri*. He there saw all the various tortures suffered by *Pápátmalu*, or wicked souls, and was greatly affected thereby. Moved by fear and compassion, he uttered aloud every where in that doleful region, the *Saiva* five lettered formule—"*Nama Sivayi*"—the hearing of which led to its repetition by the whole of the sufferers: the potency of the charm was so great, that they were delivered from their state of peril, and translated to *Cailasa*, the paradise of *Siva*. Disgusted at losing his subjects, *Yama* went and complained to *Siva* against *Sananda*; but *Siva* replied that *Sananda* was born under a special influence from himself; was a faithful votary; and recommended *Yama* to return whence he came.

Note.—The book is entered in Des. Catal. vol. 1. p. 337, art. 53.

b. Manuscript Books.

Manuscript book, No. 23.—Countermark 393.

Rámabhyudayam, or a popular poem on the adventures of *Rama*.

Referring to the notice of this work, in a preceding part of this report (palm-leaf MS. 98), it only needs to be observed, that, whereas the palm-leaf copy is exceedingly imperfect, this copy on paper is complete. It follows generally the details of the *Rámáyana*, in an abridged form, and is divided into eight *asvāsas*, or sections.

The book is written with indelible ink, and as a whole, is in extremely good preservation.

It is entered in Des. Catal. vol. 1. p. 334, art. 46.

Manuscript book, No. 6.—Countermark 899.

Section 1. Journal of *Nitala-narayan*, from February 1816, to March 1819, in Travancore.

This journal consists merely of tabular memoranda of towns and villages, or observable places passed; and is a sort of itinerary addressed to the writer's own recollection, without having been drawn out into a fully written report. This state of the document may perhaps be accounted for, by reason of his employer being called away to Calcutta in 1819. I have usually passed by such reports. This one is of less worth than usual. It is written on China paper, which is uninjured, and the ink will long continue legible.

Section 2. Account of ceremonial purifications, and other customs of the *Smarta* Brahmans of *Kerala desam.*

This small and brief document, written on China paper in Telugu characters, is in the Sanscrit language; and will be adverted to, in the proper place.

Section 3. Account of *Sancaráčharya*, and the *Namburi* Brahmans.

According to this document *Sancaráčharya* was the illicit son of a widow; born by reason of vows, made in jest, before a *Saiva* emblem. On his birth, his mother was excluded from her tribe, by the *Namburi* Brahmans. The child made great progress in learning; and, travelling to Conjeveram, there formed a shrine; from doing which he is herein said to have derived his name. At a later period he laid down 64 rules for observance in the Malayalam country. Some rules were also prescribed by *Parasu Rama.* Copies of these rules, in their substance, are given; they relate to many matters of daily intercourse, in life; and to various ceremonial observances.

This document is written on China paper, but not injured; and the ink will long continue legible. There are a few copies of short inscriptions in Sanscrit *slocas*, not of great importance, but to be noted in another place.

Manuscript book, No. 3.—Countermark 693.

The contents of the three first sections of this book, relate to every

minor details, respecting sixteen villages; the whole occupying only a few octavo pages, and containing lists of villages, and matters therewith connected, of no consequence.

Section 4, being stated in the index to contain an account of *Budam*, a ruined city, attracted more special attention. On examination, it appears that the *Jainas* held an ascendancy, and built this town, in the *Repalli* district. But discussions arose between them and the Brahmans, which led to the persecution and punishment of the *Bauddhas* (which last term is also used). The town which they once inhabited, becoming depopulated, went to decay, and finally to ruin; and the ruins are stated to be extensive; while, according to common report, amidst the ruins there are buried images, and other remains, of the *Bauddha*, and *Jaina*, system of ritual worship.

Section 5. Relates to a village called *Buda-palli;* deriving its name also from a *Bauddhist* founder; but concerning which there is nothing particular, claiming special notice.

The remaining four sections are occupied with very brief accounts of twenty-two villages, and one *agraharam*, so minute and unimportant as to claim no further attention.

Remark.—The book is only an octavo, firmly bound; the ink good; the country paper in some places is a little damaged by worms; but all that is required to its effective preservation, is the being occasionally opened, and exposed to the air: the neglect of which precaution has given occasion to much of the damage sustained by the collection.

Manuscript book, No. 42.—Countermark 796.

The *St'hala mahatmya* of *Tirukola-kudi* fane, in the *Siva-gangai* district.

This paper, not noted in the table of contents, has been pasted into the book, and is contained on three pages of country paper.

At the request of *Agastya* and *Pulast'hya*, *Siva* usually resident on *Kailan-giri* (or *Cailasa*), came hither, and taught instructions conformable to the *Saiva* system; while seven *sactis* also became resident there, whence the fane is sometimes called by the name of *Siva*, sometimes by that of the *sactis* aforesaid. The legend is of no other use, than to add an item of evidence to the first planting of the *Saiva* system in the extreme south.

The remaining contents of the book are found to contain an account of the supercession of the old *Pandiyan* kingdom, in the time of *Chandra Sec'hara*, by the northern dynasty, of which *Visvanát'ha Nayak*, was the first; and coming, with considerable fulness of detail, down to the end of the reign of *Tirumala Nayak*. From this last mentioned circumstance; and from internal evidence, of style and manner, I perceive the document to be a first part of the narrative, of which a second part, and verbose continuation, down to the entire cessation of the dynasty, is contained in MS. book, No. 31—Countermark 785, and noticed in my first report (B. Telugu). A translation of this latter was published by me among annotations in the 2d vol. Or. Hist. MSS. I did not at the time know why the account therein commenced with the son of *Tirumala Nayak*; but the present document, now met with, explains the reason. The two parts being taken together constitute a complete history of the northern Madura dynasty; fuller in details than any other one, I have yet seen. This part ought also to be translated. This first portion is in much better preservation, than the second was heretofore found to be. Still as the China paper on which it is written is fragile, and the ink not good, its restoration has been judged suitable; since I regard the document as one of value.

I have examined it in various places, so as to satisfy myself concerning its contents, but the reign of *Pedda-Crishnapa-nayak*, successor of *Visvanat'ha-nayak*, was scrutinized with the most care, in reference to the war against *Tumbichi Nayak*, and with a view to see if it confirmed the statement in palm-leaf MS. No. 124 (see 3d report, B. Telugu 1), respecting an invasion of Ceylon, by that king. The account of that event is found herein; with two minor variations of some consequence. The invasion is attributed to a refusal by the *Singhala* king to send pearls and elephants; demanded by the Madura king, as a compensation in place of pecuniary tribute. Some difference is observable in the incidents of the war; and, especially at the close, the *Singhala* king instead of being killed in battle, is represented as conquered, and consenting to send the pearls and elephants, and thereupon having all his authority restored to him, and acknowledged. This attestation to the leading fact of an invasion of Ceylon, from Madura is of importance. There is also a repetition of the assertion in the aforementioned MS. that *Pedda Crishnapa Nayak*, exacted tribute from the Malayalam king. No external indications could have led me to expect any such document in this book; and the need of patient research in the documents of a collection, at first so loosely and carelessly thrown together, is the more apparent.

Note.—The table of contents, as entered at the head of the book, may be seen on reference to the Des. Catalogue vol. 2. p. 50, art. 42. According to that table there should be six sections, referring to Chittoor, to Vellore and Arcot, to Chingleput, to Sadras, to Gingee, and Trivalore, not a word* answering to which indications is to be found. The index must have been prepared for other matter; and the documents herein contained, put in perhaps at the discretion of a native *muchi*, or binder. However, now that the real contents are ascertained and appreciated, the mistake ceases to be of consequence.

Manuscript book, No. 32.—Countermark 722.

Appended to the full, and interesting, account of the princes of Warankal, abstracted in my last report, is a paper concerning *Calyanapatnam*, then adverted to, and deferred until the palm-leaf MS. No. 128, *Basavanna Calagnána*, had been examined. Though both relate to the *Vira Saiva* sect, and to *Bassavanna*, as one of its distinguished promoters, yet the subjects of the two works differ. This appendix is therefore here resumed.

It is entitled an account of the minister of *Vijala raja*, who ruled in the town of *Kalyána*.

The elder and younger *Basavésudu* were the founders, or revivers, of the *Jangama* sect. *Pedda tanda Basava*, the elder, is stated to have been an incarnation of *Nandi*, the bullock-vehicle of *Siva;* sent down, by an agreement between *Siva* and *Parvati*, to restore and spread the *Vira-Saiva* system. *Chena Basava* was his sister's son, or his nephew. Various narratives are introduced, and among them that of *Kuna Pandiyan*, who destroyed the *Samunas* at Madura; and is, in consequence numbered among the *Jangama* votaries, by themselves. The great topic is the overthrow and extermination of the *Jainas*, which every where seems to have been accomplished by means of ultra *Saivas*. The precise locality of *Kalyanapur* is doubtful; but it was in the north-west part of the peninsula, where the *Jaina* system, under various rulers, greatly prevailed. The two *Basavas* every where exterminated the *Jainas;* and, at length, effected the death of *Vijala-raja*, their master, who was a *Jaina*. On this subject there is prospectively much to come. The present document is therefore now dismissed; with the sole further remark, that it is in very good preservation.

* Since the above was written I have discovered that the index, proper to No. 41 was bound up in this book, and *vicê versa*.

Manuscript book, No. 28.—Countermark 218.

The contents of this octavo volume, relate to forty-six villages, in Telingana proper; the contents of each section being very brief; and after the investigation made with reference to other villages, in the same general locality, not offering any thing of leading importance. The 36th section has a notice of the tribe of weavers, in that country; of course of no material consequence.

This book as to paper, is in extremely good preservation. The ink is black and indelible. The cover is loose, at the back, through careless binding; but, with ordinary care, the document may be preserved many years.

Manuscript book, No. 29.—Countermark 719.

This book, of like size with the preceding, relates to the same general neighbourhood, and contains details of thirty villages, and *agrahárams*, or Brahmanical residences, the latter granted by *Mukant'hi* chiefs. Binding excepted, the whole is in good preservation, and much on a par, in all respects, with the preceding volume.

Manuscript book, No. 30.—Countermark 720.

This is a very thin quarto volume, and contains accounts of ten villages, somewhat more full than the preceding; but not claiming minute abstract. These villages are situated in, and near, the *Chintapalli* district.

The paper on which this book is written is thin, and inferior to that of the two foregoing ones. It has been in some places perforated by insects; but not to any serious extent. The ink is good; the binding loose at the back; but the whole will last long, with only common care; the contents are not of much interest, or consequence.

Manuscript book, No. 2.—Countermark 340, *Bhadra-parinayam*, an epithalamium.

A poem in three sections by *Peddanácharya*, relative to one of the eight principal consorts of *Crishna*; demanding of course no special attention. Some little damage by worms being excepted, it is in good preservation.

Note.—It is entered in Des. Catal. vol. 1. p. 320. art. 8.

Manuscript book, No. 29.—Countermark 312, *Pratapa-Cheritra*, or *Kakatiya vamsavati.*

This production is a poetical account of the *Ganapati* kings of *Warankal.* It is composed in the *dwi-pada* measure. The general subject is the same as that of MS. book, No. 32; of which a lengthened abstract was heretofore given. The only difference is that this is more ornamented, as being in verse, the substance in both is the same. There is a Sanscrit poem by *Vidyanāt'ha*, entitled *Pratapa-rudrayam*, of which this present production may be a Telugu version; but not having the composition of *Vidyanāt'ha* in possession, I can only offer a conjecture. The work under notice has within itself an indication to the effect, that it was produced by the united efforts of three sons of *Casamalaiya*, a *Brahman*, of the *Atri-gotra*, or tribe of *Atri.* The book is in excellent preservation.

C.—MAHRATTI.

Manuscript book, No. 3.—Countermark 889.

Section 1.—Legendary account of the fane of *Varada-nāt'ha*, and of the *Sunda* river.

Legendary and *pauranical* reference. When *Siva* and *Parvati* were on *Cailasa*-mountain, *Nareda* came and represented that since *Brahma* had five heads, he was by reason thereof very proud. To lower his consequence *Paremesvarer* cut off one of his heads; and then, in order to expiate this crime, he wandered about for twelve years as a mendicant, asking alms. He did penance at this above-mentioned, place. *Narayana-murti*, knowing this circumstance, came hither; and taking up some water from a pond, with the ordinary drinking vessel made use of by *Brahma*, he with it, poured water over the head of *Siva*, and by doing so removed the guilt of his crime. By virtue of the touch of the said vessel the pond became a river. Hence all who bathe in that river, will, by doing so, wash away all guilt, or defilement whatsoever.

2d, *adhyayam.* Several persons, came hither, and formed in all twenty-four *tirt'has* or pools, the names and virtues of which, are specified. Among them are the names of *Brahma, Vishnu, Siva, Indra, Agni, Cubera, Isani,* and others.

3d, *adhayayam.* A *Brahman*, to whom the titular name of "hearing the *Vedas*" is given, came hither, and by bathing evening and morning

in the different pools, was favoured with special visions of the deities, whose names they respectively bear, and obtained beatification. *Vishnu* after bathing in all these pools, went and succeeded in destroying the *racshasa,* named *Saugata-rana.* In the war between the *devas* and *daityas,* many of the latter, by bathing here, obtained beatification. The entire three hundred and thirty millions of celestials bathed here. Near to the river is a fane called, *Varada-nat'ha-cshetram.*

REMARK.—Local mythology apart, the only point of notice is, that *Vishnu's* destroying the above-mentioned *rācshasa,* seems to be a symbol of the ever recurring subject—the triumph of Hinduism over the *Bauddhas ;* the term *Saugata* being somewhat synonymous with Giaour, or infidel.

Section 2. Accountof *Mayura-Verma,* a king of the *Cadamba* dynasty.

1. The account is put into the mouth of *Suta-rishi,*as related to a *Brahman.* The destruction of the *Cshetriyas* by *Parasu Rama ;* his disgust with the *Brahmans,* and retiring to a hermitage : several *rishis* followed ; and, looking on the western sea, advised him to reclaim land from it. The sea-king promised to render to him land, as far as he could cast an arrow. He thus reclaimed a tract of land of three *yojanas* (30 + miles) in breadth westward; and in length, from *Nisica* to *Canya-Cumari* 300 *yojanas.* Southward, or + 3000 miles. He located *Brahmans* therein, turning the *Boyi-jati* into *Brahmans ;* settling one thousand of them there ; and appointing to them lands for their support. He told them that if they had any cause of sorrow, or regret, they might think on him, and he would appear. He then retired to the fane at *Gokernam.* The said *Brahmans,*to test his veracity, recalled him, without cause ; whereupon, being angry, he condemned them to lose the power of assembling together in council ; and to become servile. They accordingly mingled with *Sudra* females ; and became a degraded race.

About this time one named *Mayura-verma,* considering those *Brahmans* to be contemptible, sent for others from *Haí-Cshetram,* and located them at different places in his dominions.

2. *Sona muc'hi* enquires of *Nareda,* why *Mayura-verma* so located the *Brahmans,* and whose son he was. In reply a legend is stated to the effect that *Siva* and *Parvati,* on *Cailasa,* agreed to come down, and look at this newly formed country. In consequence of their doing so, an infant was afterwards found under a *Cadamba* tree, in the wilderness; to whom the epithet of *Cadamba* was therefore applied. It happened that the *Mulata* country being without ruler, the people placed

a pot of water in the trunk of an elephant, agreeing to elect the person on whom it should be effused. The elephant went to the *Cadamba* wilderness, and poured it over the head of the young man there, who was proclaimed king of that country, and also of *Caurashtaca** *desam*. He went to the *Kerala-desam*, to perform homage; and, at a shrine there, was confirmed in possession of the kingdom. He was married, and his son was *Mayura-verma*. He complained of the degeneration of the country *Brahmans*, and invited others to come and purify his country. A few other particulars are added, as to the location of the colonist *Brahmans*.

Remark.—This section, being rectified from its legendary admixture, is of value.

Section 3. Account of *Srinivasa* fane, in the village of *Balamuri*, in *Canara*.

Bhishacācharya relates the excellency of the *Caveri* river. It is presumed that here *Caveri* (like *Ganga*), is used generically for a river. The purport of the paper, written partly in Balbund, partly in Mahratta letters is legendary, intended to account for the homage of *Vishnu* under the name of *Srinivasa*, as the lord of *Lacshmi*. Mythology excepted, there seems to be nothing of consequence, in this section.

General Remark.—This book is injured in the binding, but the country paper within is but slightly perforated by insects, the ink indelible. It may therefore pass, as not requiring, for the present, any further attention.

Manuscript book, No. 4.—Countermark 916.

Section 1. On the war of *Sālivāhana* against *Vicramaditya.*

In this section the usual enigmatical account of the birth of *Sālivāhana* is given; his mother herein being described as the daughter of *Bhascara*, a *Brahman*. The difference from other accounts is that, after the battle, *Vicramaditya*, having survived, sent messengers to treat with *Sālivāhana*, and agreed to pay tribute, on condition that each should rule on either bank of the *Nerbudda* river; that is *Vicramaditya* to the north, and *Sālivāhana* to the south. In another *Mahratta* document heretofore abstracted, such a division of one kingdom into northern and

* By a modern corruption, Gujerat.

southern was mentioned, with some details of posterity on either side; and there really may be truth in such a simple statement, respecting a remote period, greatly mystified by *Hindu* writers. As to *Sālivāhana*, having for father a *naga*, or snake, it is mere symbol The illegitimate son of *Kulottunga* named *Adondai*, the conqueror of the *Curumbars* is, in several Tamil manuscripts, said to be the son of a *Naga canya*, or female-serpent, which plainer books tell us means a female slave, or dancing girl, of *Kulottunga Chola's* court. To build any wild deductions on such figurative terms in *Hindu* writings is nonsense. The *Brahmans* have their "slang" language, just as much as the gipsies, or the jockeys of Newmarket. To get at their meaning, where they purposely conceal it, is the problem. Colonel Mackenzie seems to have had a hint given him; since he has written in pencil on the document, "A tantrum, or specimen of fabulous history." A *tantra* no doubt it is; and the meaning seems to be that the glorious *Vicramaditya* was beaten by the son of a slave, or wild forester.

At the end of the document, it is stated to have been expressly compiled from other books by *Sri-pati rao*, and *Chimmanaji-appa*, in November 1805, at Ahmednugger.

Section 2. In the injury to which the book has been exposed, this section appears to have been lost.

Section 3. Account of *Damaji Pant,* a person remarkable among the *Vaishnavas*

About 700 years ago, one *Damaji* was employed as a gomasteh, or factor, at the court of the Delhi-Padshah; and, as a reward for the skill which he displayed, a small district was made over to him, as a zemindary, subject to a tax. On going to his district, *Damaji* greatly abounded in liberality to *Vaishnava Brahmans*, multitudes of whom in consequence resorted to him; and could not be refused. The result was that *Damaji's* tax ran on in arrears; until, at length he was compelled to write to the Padshah, and explain his insolvent situation. The Padshah sent officers to take him; put him in fetters; and bring him to Delhi. But the deity at *Panrapur* (or Panderpore), hearing the misfortune of his votary, represented the case to *Rucmeni*, his spouse, and borrowed from her, all her golden, and jewelled, ornaments. Assuming then the appearance of a relative of *Dámaji*, the said *Crishna* went to the presence of the Padshah; offered payment of *Damaji Pant's* arrears; and demanded a receipt, and full acquittal. The Padshah was so struck with the surpassing beauty of the messenger's countenance,

that for a time he was unable to give orders; but at length he directed the requisite documents to be made out; and on signing them sent word to *Damaji*, that he wished again to see the messenger. When the message, and acquittal reached the insolvent, he was much embarrassed; until, pondering over all the circumstances, he discovered that it was a manifestation of the *numen*, whom he worshipped at *Panripur*, that had interposed in his behalf. He then vowed a pilgrimage to that shrine; and, as the document says, the Padshah went with him: they together bathed in the *Chandra bhaga* pool, at *Panderpore*. This account was expressly written for Colonel Mackenzie, by *Shani-rao*, on the 24th December 1805, at Ahmednugger.

Section 4. Account of *Prasanna-Prabhu.*

This is merely an inane legend concerning a devotee of modern time; written to satisfy the curiosity of Colonel Mackenzie: but apparently not of the slightest value. The person referred to, had signalized himself by devoteeism of surpassing character.

There follows a tale, or fable of an ape and an alligator; taken from the later portion of the *Pancha-tantra* tales, as narrated by *Vishnu Sarman;* of course not relevant to the present enquiry.

Remark.—According to the table of contents, prefixed to this book, there ought to be in all eleven sections; but all the matter now found in it is specified in the foregoing notice. The binding is broken; part of the book appears to be lost; and what remains has the margins, and some part of the writing, devoured by termites; their mode of doing mischief being easily distinguished from that effected by worms. A sufficient notice of the contents has been given. The account of *Vicramaditya* and *Sālivāhana*, is like other narratives, save the difference already indicated. The whole of the lengthened document, I do not think worthy of restoration; and all besides, is quite worthless. The book is passed without further attention.

Manuscript book (without mark or number).

In this book a quantity of loose leaves, containing Mahratta and Canarese papers, appears, to have been put in at random; possibly because, having been scattered, their order was unknown. On looking at the contents of the Mahratti, it appears that some part of the pages should belong to the foregoing book, No. 4. These relate to some *Hindu* auxiliaries of the Mahrattas, and legendary miscellaneous topics; and some

part relates to contents of MS. book, No. 35 (Des. Catal. vol. 2. p. 116), in those sections that refer to the *Bala Rāmayana*, to *Bhoja raja*, and to the birth of *Sita*.

It is not now possible to extract order out of so much confusion. Happily the contents of the papers, so disarranged, do not seem to be of consequence. A perusal leaves the impression, that every thing material, in reference to the Mahrattas, is found in other documents; and as to the legendary, or mythological, matter this need excite very little regret: the quantity of details, on such subjects, being superabundant.

A few other loose sheets not included in this book, or any other one, are found on examination to be wholly legendary, and worthless. Not knowing any better place for them, they are put along with the other loose papers, in this book; and the whole must be passed, as incapable of receiving orderly, and complete adjustment; at the sametime not meriting restoration; even supposing it could be successfully effected.

Manuscript book, No. 34.—Countermark 784.

Section 1. Account of the allowances of the fane at Madura.

Such is the section heading prefixed, and also entered in the Des. Catal. The real contents are very rough and loose memoranda, concerning allowances to the fane at Tripety, of grants made by *Chola* and other *rajas*, and of the expenses of processions, or other festivals.

Section 2. Account of allowances to the shrine *Minacshi-amman*, at Madura.

This document relates to the said *Saiva* fane; containing as in the former paper, rough memoranda of grants, by various *Pandiyan* kings; and accounts of expenses at different festivals, and processions.

Section 3. Account of the allowances to the fane of *Alagiri*.

This section relates to a place of celebrity, about ten miles from Madura, situated on a hill; the image on which once a year pays a visit to the *Vaigai* river, in public procession. The memoranda of grants, and expenses, are similar to the preceding.

Section 4. An account of Mahomedan affairs in the Madura district.

This is a more connected statement, chiefly referring to revenue arrangements, and *jaghirs* from the Mahomedans.

Section 5. Account of *Indra* and *Nahusha raja.*

This is the legend taken from an older *purana,* with which the Madura *St'hala puranam* is made to begin: needless to be further detailed.

Section 6. Narrative of *Lava* and *Cusa.* Some particulars concerning the two sons of *Rama* of *Ayodhya;* of no special consequence.

Note.—The book on the outside is labelled "Tamil kyfeats," as pertaining to a locality where the Tamil language is spoken; and is found entered in the Des. Catal. vol. I. p. 68, art. 34. among Tamil documents. The language is however Mahratti, throughout; and this circumstance, I presume, arises from Mahratta accountants being employed at Tanjore, and latterly also at Madura. Hence I suppose these papers to have been, in part, extracted from cutcherry-papers: the entire control of festivals, and of allowances to them, being vested in the Principal Collector of the district.

The document is in very good preservation; and can at any time be consulted if necessary.

Manuscript book, No 39.—Countermark 947, account of the capital of Arcot.

There is, at the opening of this document, some matter which appears to be taken from Ferishta, concerning the origin of the dynasty of Timur Shah. The reign of some of his descendants is adverted to, and then a transit is made to the conquest of the Carnatic by Alemguir; and to the Mahomedan ascendancy. Thenceforward there is an account of the government, and fluctuations of power, at Arcot; with references to Hyder Ali, Tippoo Sultan, and finally to the English.

Remark.—This document, in the latter part, may be of some value. It is in moderately good preservation; though in some places a little injured by insects.

It is entered, among Tamil papers in Des. Catal. vol. 1. p. 50, art. 39.

Manuscript book (on the cover, and first page, No 51—Countermark 488. *Bhairaves-vara Cadha,* &c. on the contents 25), tales of the *Betala* and *Vicramaditya.*

This Mahratta version of these tales is damaged; and, having been loosened from its proper cover, seems to have been put at random into the covers of a book, the contents of which should be Canarese, with re-

ference to the *Vira Saiva* sect; or the persecuting, and exterminating,class of *Hindus.* Where the said matter in Canarese is, I know not. With the discrimination given, this book must pass as it is. It requires no further notice.

In the Des. Catal. vol. 2. p. 115. the entry occurs; art. 25. "Thirty-two stories of *Vikrama-raja,*" and denotes, I presume, the book as it originally was among Mahratta documents.

Manuscript book, No. 5.—Countermark 650.

Pandu-rangha Mahatmyam, legend of the fane at *Panderpur.*

This book is written in Balbund characters, and is an incomplete copy, or rather a fragment of the legend in question. There being a better copy in Telugu, before abstracted, this book requires no further notice. It is in moderately good preservation.

D.—MALAYALAM.

It was heretofore stated that, to the best of my knowledge, all the Malayalam MSS. had been attended to; but, on the remainder of the collection coming more completely under my inspection, two palm-leaf MSS. in Malayalam were met with, among the Tamil documents, and one amidst the Telugu palm-leaf manuscripts; with some portions in Malayalam, mingled with Tamil and Telugu, in manuscript books. The following notice relates to these different documents.

1. *Kerala Ulpatti,* an account of Malayalam, No. 3.—Countermark 632.

This is a complete copy of the *Kerala Ulpatti,* on palm-leaves; agreeing with the copy which was before noted from a manuscript book. One leaf which was broken has been restored. The remainder is in good order..

Appended is the tale of *Sacara,* being I perceive, in all probability, the original of the Tamil MS. entitled *Sacara-cadha,* abstracted at the commencement of my third report. This document has the beginning, and is in regular order to the 25th leaf, but the remainder is wanting. This fragment is slightly touched by insects, but upon the whole is in good order.

2. Fragment of the *Kerala Ulpatti.*

This document was without label, number or any other of the usual marks of these manuscripts. On examination it was found to be an unconnected part of the *Kerala Ulpatti,* in that portion which, relates to

the *Art'ha-Brahmans,* or the fishermen turned into Brahmans by *Parasu Rama.* There are only seven leaves, which are on the said topic, but without any proper close; being consequently incomplete.

3. *Kerala-Crisha-gita,* No. 1.—Countermark 633.

This is a poem on agriculture: a species of native Georgics. A manuscript copy was before noticed, and abstracted (vide 2d Report, book No. 3, sect. 3).

This manuscript was met with among the Telugu books; and, by consequence, escaped an early notice.

It is small; written on talipat leaves; complete; and in good preservation.

It is entered in Des. Catal. vol. 2, p. 95. art. 2.

Manuscript books.

Manuscript book, No 13.—Countermark obliterated.

The first, and largest, part of this book consists of Tamil papers, relative to the Malayalam country, of very little consequence: they are adverted to, and in part abstracted in my fifth report, under the head of Tamil documents. A few loose papers in the Malayalam language were unexpectedly met with, at the close; of which the following is a notice.

1. Two loose leaves, the first containing Sanscrit law *slocas,* with a Malayalam interpretation.

2. (Sec. 46, of the book). An account of the *Māpillais,* or Mahomedans, of *Ponani.*

States their having been brought from Mecca, by *Cheruman Perumal,* and located in this country; conformably to notices in preceding papers.

3. An inquiry into the difference between two tribes of military people, termed *Cola surupam* and *Tripal surupam,* made by judge Baber, with the replies in the shape of question and answer. The difference seems to have been thought of importance, as depositions were taken on oath, in the presence of an idol. The answers appear to be inane; at all events, of little or no consequence, in the present researches.

4. Enquires as to right of inheritance; which, in the Malayalam country, is not in children of direct descent, but only to sister's children.

5. An enquiry from the provincial court answered by two *Nambúris,* and one *Potuval,* as to the legality of selling the house of a

debtor for the advantage of creditors; without the consent of the debtor's proximate relations. The answer states, that entailed property cannot be so seized and sold; but any house previously purchased by the debtor, on his own account, may be so available.

6. Relates entirely to law, in matters of theft; resolved by *slocas* from Sanscrit authorities.

Remark.—It will thus appear that the Malayalam portion of the book is not relevant to the object of the present investigation. Although the several papers are but in an indifferent state of preservation, yet it does not seem to be of consequence to re-copy them. The entire book, like many others, yields a specimen of negligent service, by the *employés* of the late Colonel Mackenzie.

E.—PALI. (As supposed).

Uttara Vadakan, No. 10.

This book, with the following one, are exceptions to the general appearance and contents of the collection. This one contains 40 broad, though short, talipat leaves; old in appearance; but in good preservation. The character seems to me, to be, the *Pāli* of Ceylon; but I cannot go beyond conjecture, as I have never seen any other than the circular Ceylon *Pāli*, and the square *Pāli* of the *Barma* country. The book has strong covers of a fine grained wood, resembling mahogany; and, if I mistake not, has written within side one of them the name "J. Sinclair, July 1818;" together with a little, from which I have made out the one above given. I regret that I have not the means of ascertaining the contents.

Mantras, No. 14.

This is a miniature manual, on small talipat leaves, much fretted away at the edges; old in appearance; and in rude writing. The characters, as above; but not so well defined. The covers have a bright polish, and inside one of them is written. "Muntrum J. Sinclair July 1818." Perhaps both books were obtained in Java, at its capture. Be that as it may, I think both were originally written, or copied, in Ceylon. Should any *Pāli* scholar, at any time, inspect the collection, it may be that a glance would suffice to determine, both the nature, and value, of the matter included.

F.—PRACRIT.

Palm-leaf manuscript, No. 62.—Countermark 140.

Mairavana Cheritra (*Grant'ha* characters), stated in the commencement to be taken from the *Jaimini Bhárata*.

1. *Adhyáyam.* Description of a fictitious town, with its various kinds of inhabitants.

2. Reference to the court of *Ráma*, the visit of *rishis* to him. His enquiries; and their congratulations.

3. Reference to the valour of *Hanuman.* The eulogy pronounced on him by *Agastya*, who narrates the tale. The sorrow of *Rávana*, in his palace, at his defeat; and complaint thereon to the inhabitants. In consequence *Mairavana*, a *racshasa*, came to console him, and to point out a scheme of revenge.

4. *Rávana* asks what can be done, not against men, but gods. *Mairavana* engages to go down to his kingdom, the inferior world, and offer a sacrifice to the evil goddess there. The wife of *Mairavana* dissuades him from any enterprize; since it must issue in his destruction. He then applies for counsel to his ministers; being still in his kingdom in the lower world.

5. *Mairavana* sets out at the head of his army, from the inferior world determined to make war. On the way evil omens appear.

6. *Vibúshana*, younger brother of *Rávana*, knowing all the preparations, which were being made, informed *Hanuman* and *Sugriva. Rama* (as *Vishnu*), was then sleeping, and could not be disturbed.

7. *Hanuman* assumed a supernatural form; and bound his tail all around the fortress, or camp of *Rama*, from the heavens down to the lower regions. He allowed only one entrance, at which he kept guard; and despatching *Vibúshana* as a scout, he gave charge of the interior to *Sugriva*, and others. It was now night.

8. *Mairavana* sent a spy who reported the preparations made; adding that *Vibúshana* only was outside, whose form thereupon *Mairavana* assumed, and going to *Hanuman*, told him to be on his guard: being allowed to enter the fortress, he took *Rama*, and his brother *Lacshmana*, both being asleep, and putting them into a box carried them down to his inferior world. *Vibúshana* was warned by evil omens; and returning, to see the cause, the deception was discovered. *Hanuman* enquired for directions; and, guided by a particular flower tree, came to the

entrance of the descent to the inferior world. Thither he went with troops, his proceedings, and the battles which followed, are detailed. It was not possible to kill *Mairavana*: he was cut into pieces; but the parts of his body came together again. All attempts to put him to death failed; until a relative pointed out that his life was in a certain cave, in the form of bees. These were killed by *Hanuman*, and *Mairavana* expired. The victor then placed the relative of *Mairavana*, who had given the information, in possession of the kingdom of the inferior regions, and took *Rama* and *Lacshmana* (both still asleep in the box, and knowing nothing of the matter), back to their proper place. *Agastya* narrated this tale to *Rama* in praise of *Hanuman*. *Rama* was greatly pleased; and showered down benefits on his successful protector. The whole time of the action of the poem was a single night.

NOTE.—The manuscript is complete, a little injured by insects, but not seriously. It is entered in Des. Catal. vol. 1. p. 97, art. 9.

There are some resemblances in this poem to others* of European production, which are to me rather surprising. Apart from which reflexion is the obvious remark, how lightly the *Hindu* votaries make of their idol gods, as occasion serves.

Manuscript book, No. 47.—Countermark 606.

Sanatcumara-silpi-sastra.

This little book is Sanscrit, in the Canarese character. It states that whereas several persons, in preceding times had written on the subject of architecture and sculpture, the author named *Sanatcumara*, having studied the whole of them, and having adopted from them, what appeared valuable, wrote down the results in this compilation. A detail is then given of the consequences that will follow from undertaking any work, in the various months of the year, some being propitious, and some otherwise. The effects of beginning to construct any edifice, under the different *nacshetras*, or 28 divisions of the lunar path. Different colours of soils adopted to the four leading divisions among Hindus. Matters such as these fill the document; not pertaining to the practical, or scientific parts of sculpture or building; but to astrological, and other indications; calculated, in the judgment of the writer, to guard against evil, and secure the greatest amount of benefit.

NOTE.—The book is in good preservation; but is incomplete. It is entered in Des. Catal. vol. 2. p. 63, art. 14.

* I allude to a passage of the *Æneid*, and to another in Milton's principal poem.

Manuscript book, No. 6.—Countermark 899.

Section 1. Containing rough notes of an itinerary, by *Nitala narayan*, was noticed under the head of Telugu manuscript books.

Section 2. *Parasu-Rama-mahatmyam*, taken from the *Brahmandam-puranam*.

This paper does not seem to be entered in the table of contents. It is a document of octavo size, written on China-paper in Telugu characters, but the language is Sanscrit. It is divided into two sections.

1. The early life of *Parasu-Rama*. The quarrel of his father with the *Cshetriyas*. The slaughter of the *Cshetriyas*. His proceeding to the west; and there obtaining from the sea-king and goddess of the sea, as much land, as he could cover by the flight of an arrow, discharged from his bow. These particulars are stated with some fulness.

2. Having settled the country, he called in *Brahmans* from the *Arya-vrata*, and located them in the country: according to this document, he advised the calling in of a king, from the *Chola* country. The document omits any mention of the fishermen made *Brahmans*, or of his displeasure against them. In other documents, the calling in the *Brahmans* from Hindustan is ascribed, not to *Parasu-Rama*, but to *Mayura-verma*.

Two Sanscrit *slocas* referred to, in the Telugu portion of this report, on examination, are found to be incomplete; and of no importance. There are imperfect lines, copied from different fanes, in the *Bhat-Malayalam* character, but the dates are only of the *Collam* era; and they offer no information of consequence.

Manuscript book, No. 12.—Countermark (torn of), *Viveca Sindhu*, intellectual wisdom.

A theological series of instructions, from a preceptor to pupils, written in the Balband character, and remaining in extremely good preservation.

Notandum.—The second part of my sixth report is thus concluded.

Madras, *November* 1838.

VII.—*Notes, principally Geological, on Southern India; from the banks of the Tumbuddra to those of the Cauvery.*—By LIEUT. NEWBOLD, 23*d L. I.*

A line drawn from the confluence of the Tumbuddra and Hogri rivers, passing southerly, and a little westerly, through Bellary, Raidroog, Chittledroog, Sera and Chinraipatam, to the fortress of Seringapatam, will give the reader a tolerably correct idea of the route, on which these notes were taken. On my return, a route a little to the east of this, by Bangalore, was pursued.

A wide expanse of sand, apparently more than a mile in diameter, marks the junction of the two rivers just alluded to. A few granitic blocks and bosses rise from the surface of this arenaceous waste, on which may be traced distinct furrows, with a direction parallel to that of the stream. They possess all the appearance of having been caused, like the furrows on the Scandinavian rocks, adduced by Sefström among his evidences of a vast ancient flood, by the abrasion of pebbles, swept over the surface by the force of water. But these furrows are still in process of formation, and undergoing alteration, under the continually renewed action of the periodical monsoon. They are generally from one to two inches broad, coinciding in dimensions with those of the rolled pebbles, found in the river bed in this vicinity, the small size of which indicates the transporting power of the water not to be very great. The depth of the furrows varies; and, in some places, has been influenced by the hardness or softness of the rock in which they occur. A few tough quartz veins have successfully resisted the abrading process, and are seen standing out, in high relief, from the surface of the worn rock; some indeed, have even formed barriers across the furrows.

From the Tumbuddra to Bellary, the face of the country presents an extensive plain, gradually rising as the traveller progresses southerly. A little to the east of Kurgode, it slopes off gently to the east and west, as evinced by the course the lesser streams take on their way to join the Tumbuddra and Hogri. The anticlinal line, if I may so term it, is marked near Beylour, by a low range of hills, having a smooth outline, and running from Dasapur nearly S. S. E., and thence pursuing a N. by W. direction, towards the Tumbuddra. The rocky swells, and granitic elevations, in the vicinity of Tekkulkota, are situated within the limits of this line. Many of the springs and rivulets, that water the plain, abound in calcáreous matter, which is observed on their beds and banks, both as a nodular and travertine-like deposit. The soil covering the

surface, is the *regur*, more or less mingled with the debris of the subjacent rocks, and the calcareous infiltrations of springs. The substratum is generally decayed granite or gneiss, but in many places a thick bed of the nodular calcareous deposit, or of a conglomerate of the granitic debris, cemented by it, intervenes, as may be observed at Tekkulkota, in the wells of the village. Around the bases of the granite hills, the regur is generally covered by their alluvium, which is reddish and gritty. Crossing the plain in a southerly direction towards Tekkulkota, the granite is seen rising into clustered hills, both at this place and Sirragorra, having a general direction to the S. S. E., though confused when taken in detail. Salbandes of gneiss are observed in the plain, between these two places, and also beds of a chloritic and hornblende schist, running S. S. E., which alternate with the gneiss.

Kurgode.—At this place the granite again rises into hills, not remarkable for their height—direction more easterly than those of Tekkulkota. A well, about 50 feet deep, at a little distance from the base of the hills, affords the following section:—3 feet regur; 45 feet calcareous nodular deposit, cementing angular fragments of granite, and boules of basaltic greenstone; 2 feet granite. The rivulets in this neighbourhood deposit a considerable quantity of carbonate of lime.

Bellary.—The fort of Bellary stands upon a convex mass of granite, the outline of which resembles the hull of a vessel reversed. Gneiss, imbedding garnets and iron pyrites, occurs in the plain: this rock, as well as the granite, between Bellary and the Tumbuddra, is cut by numerous basaltic dykes, the direction of whose main branches is generally easterly, inclining towards the south. From Bellary to Manchanhully, the route lies, as far as Halicundi, over the surface of a plain, intersected by date nullahs. A greenstone dyke is crossed to the N. E. of the latter place, and a little to the S. W. a range of hills, taking an east by southerly direction, composed of chloritic and hornblende schist.

Manchanhully.—Formation gneiss, and a fine grained granite, containing nests of black, brown, and silvery mica, in small scales.

Raidroog hills and Gorisamudrum.—The Raidroog hills are of gneiss and grey granite. Veins of iron ore (hæmatitic), and nests of mica, abound in the former. Direction of the hills N. by W.

Bomanhully.—The lowest rock here is of a reddish felspar, rapidly decomposing, traversed by beds of greenstone.

Chittledroog.—The hills on which the fort stands are a cluster of seven, terminating the northern extremity of a mountainous crescent. They are composed of a coarse-grained crystalline granite, containing a large proportion of quartz, black foliated hornblende, white and red

felspar, and a little mica. The general outline of these fortified heights resembles that of the rocks near Bellary: vast blocks, both rounded and angular, resting on a large convex plateau, and near the base forming caverns. The height of the most elevated has been calculated at 800 feet above the plain. The general direction of the range is N. by E.

Herrioor.—The bed of the Hogri here is of clay slate, into the composition of which, chlorite and a little mica, in minute darkish scales, enters; giving the rock a speckled appearance. Some varieties are compact, hard, and of a fibrous structure; others sectile, earthy, and dull. Thin fragments of the latter, held in a platinum forceps before the blow-pipe, fuse partially, but with difficulty, on the edges into a greenish grey enamel. The surface of the plain is undulating, and covered with fragments of the subjacent schists

Sera.—The country between Herrioor and Sera, is a succession of plains, the principal rock of which is gneiss, crossed to the E. by dykes of greenstone; beds of a hard mica slate occur, traversed by veins of ferruginous quartz, and quartzy iron ore.

Curbah.—From Sera, through Columbella and Chuloor, to the vicinity of Curbah, the surface of the country is an undulating table land, gradually rising towards Seringapatam—the formation much the same as between Herrioor and Sera.

Near Curbah, however, the principal rock appears to be of a white quartz, with talc disseminated. The whole has a schistose structure, common to many of the rocks in the vicinity of Seringapatam. A brown variety, with mica in spangles, resembles avanturine. Compact kanker and nodules of hæmatitic iron ore, are found here in beds, near the surface.

Belloor.—Approaching from Myasamudrum, the Mysore plain, or table land, is diversified by two low broken ranges of hills, of a fine grained grey granite, with small crystals of shining felspar. A coarse sort of gneiss is found in the beds of nullahs in the plain, with largish scales of silvery mica, and crossed by beds of talc slate with chlorite.

Near Belloor, these hills subside into a rocky swell, on which rests both masses of granite and gneiss. At Belloor, the lowest stratified rock I observed (18 feet below the surface), was gneiss abounding with small scales of glittering black mica. The strata were slightly inclined—dip west. Potstone, talc, and chlorite slate, associated with the gneiss, are found in the neighbourhood. Direction of the hills nearly due north.

Nagamungalum.—Plain—formation gneiss, with both white and pale red quartz. Dip of strata 41° to the westward. Direction north.

A little to the west of the fort runs a low ridge, with a smooth undulating outline—the formation of which is a variety of talc and mica slate with chlorite.

Sravan Belgola.—The road from Nagamungalum to Belgola, lies over a succession of low roundish hills of gneiss, abounding with large plates of silvery mica. The higher peaks and tors, as well as the rock on which stands the Jaina colossus of Gomutu Raya, are of granite. The latter rock is a steep convex boss, crowned by the usual detached, irregularly shaped masses of a fine grained granite, consisting of granules of cloudy quartz, and felspar of a pale rose colour, with small black scales of mica. The ascent to the temples and colossus, on the summit of the principal hill, lies over the steep convex rock, which is rendered slippery by the bare feet of the priests and pilgrims that frequent the place. I observed several inscriptions in Canarese on the surface. The temples and porticos are of simple, massive and elegant architecture, particularly the entrance to the quadrangular enclosure, in which stands the Jaina colossus. The effect produced by the first view of the statue on passing into the quadrangle, is singular and imposing; but a close inspection can hardly be gratifying to the eye accustomed to the exquisite proportions of the statues of Europe. It is about 70 feet high, entirely divest of drapery, in an erect position, facing the north, and has the curly hair, large pendulous ears and thick lips, so peculiar to Jaina images: the placid expression of the features reminds one of the head of Memnon: the legs are wreathed with the leaves of a parasitical plant (the ratimulla), sculptured in the granite, and together with the hands are clumsily executed. The opinion of the Duke of Wellington, that the rock had been cut down until nothing but the image remained, I found corroborated by the statements of the oldest priests, and a personal examination of the base. Two black slabs, bearing long inscriptions, copies of which are lodged in the library of the Literary Society of Madras, stand on each side the entrance into the quadrangle.

The village lies between the two hills; it contains, besides temples, a handsome Jain college, a large bouri, the white houses of the Shravaks, or Jain laity, and the dwellings of a few Hindus and Mussulmans.

Seringapatam.—The principal rock seen in the island of Seringapatam is gneiss, associated with mica and hornblende schist, and also with a schist which contains both these minerals combined with felspar and quartz. The best section of these rocks is seen in the fosse surrounding the fortress: as we proceed from the Wellesley bridge towards the Mysore gate, we

observe dykes of a silicious rock*, penetrating the gneiss, and in some places overlapping it for a short distance on either side the dyke. This rock, like the trap rocks of Bijapore, has a tendency to the schistous structure, and splits like them, when struck by the hammer, into angular fragments, the superficies of which, exhibit similar dendritic appearances, but more perfect. The fissures by which the rock splits (the dry cracks of European miners), as may be discovered by a microscope, and often even by the naked eye, are pre-existent in its structure, and resemble those in basalt and other substances, which have cooled, after being greatly heated. The dendritic appearances in igneous rocks have been ascribed to the infiltration of metallic oxides, and with more show of reason to electric currents, circulating through the pores of the rock; but in some instances, particularly in rocks of acknowledged aqueous origin, they assume so much the character of mosses and ferns, that it would be matter of some interest, if botanists would institute a minute enquiry into the forms usually seen in each rock, with a view of ascertaining the question of their organic origin. In rocks of a decidedly igneous character, the arborescent appearances are generally far less perfect than those in limestones, and other rocks of deposition; and will be probably found, as just remarked, to be occasioned by the metamorphic powers of electric currents, acting upon metallic particles disseminated in the substance of the rock. The beautiful arborescent outlines in mocha stones are now supposed to arise from mineralized plants of the cryptogamous class, and Dr. Macculloch has detected both in them, and the moss agates, aquatic confervæ, unaltered both in colour and form, and coated with iron oxide. An onyx agate belonging to the Earl of Powis, contains the chrysalis of a moth; and the red colour, observable in this class of minerals, has been discovered by M. Turpin to be owing to an insect, the *Protococcus Kermesinus*, in form of seminules, or red globules. M. Gaulty de Chaubry found, that when powdered cornelians were mixed with black oxide of copper in a porcelain retort, and heated to redness, carbonic oxide and carbonic acid were disengaged; and some pyro-acetic acid, and pyrogenic oil formed: proving that the colouring matter of the mineral is of an organic nature. Apologizing for this digression, I shall rest content for the present, by calling attention to this curious subject, expressing at the same time, my strong belief, that many appearances in transition and secondary rocks, hitherto considered

* This rock is probably identical with that described as a hornstone by Buchanan, and a silicious slate by Dr. Benza; the fissures imparting a schistous character to the rock, do not resemble the laminæ of deposition.

as inorganic, are, in truth, lapidifications of animal or vegetable matter.

The formation of the silicious rock is evidently posterior to the gneiss, as we see it, as before mentioned, not only slightly overlapping and penetrating it, but also penetrating the associated brilliant hornblende schist. It appears to be however, anterior to the intrusion of the greenstone dykes, in the *immediate* vicinity, one of which is seen in the fort ditch, slightly overlying it. It is generally of a greenish grey colour, tough, compact, translucent at edges, fracture semiconchoidal, sometimes containing minute shining felspathic crystals. Before the blow-pipe per se it whitens, and melts slightly, and with difficulty at the edges: fuses with carbonate of soda, with effervescence, into a greyish white enamel. An opaque variety, which appears to consist entirely of compact felspar, melts without much difficulty per se into a light grey enamel.

A dyke of red porphyry (noticed by Dr. Benza), is seen crossing diagonally the bed of the Cauvery, opposite the sally port, where Tippoo fell covered by the wounded and slain. The direction of the dyke is N. 40 E. It consists of flesh-coloured felspar crystals, imbedded in a paste of the same mineral, but of a deeper red, having a number of dark green acicular and prismatic crystals, resembling tourmaline, disseminated. The gneiss at the junction, presents few indications of alteration, beyond being rendered more compact and indurated. Large deposits of tufaceous kanker take place on the banks of the river, consisting generally of a whitish grey carbonate of lime, with a sponge-like structure, imbedding nodules of a more ancient formation, and a more compact variety ; also bits of felspar, quartz, &c., debris of the subjacent rock, and roots of grasses. The gneiss is traversed by pegmatitic veins of red felspar, and a light grey translucent quartz, which are themselves penetrated by thin veins of compact felspar, tinged of a faint pistachio green, probably by actynolite, a mineral generally found associated with the pegmatitic veins. The rock composing the green veins, before the blow-pipe, first reddens; secondly becomes black, and finally melts into a dark emerald.

Island of Seringapatam.—The island of Seringapatam is formed by the bifurcation of the Cauvery into two streams, which again unite a little to the eastward of their separation. It is about four miles in length, and about one and a half in breadth in the middle. Its surface is convex, sloping to the streams on either side. The fortress is situated on the western extremity, and the suburb of Shahr Ganjam, about the centre of the island. Near this in a cypress garden, stands the handsome mausoleum of Hyder and

Tippoo. This mausoleum is supported by finely polished pillars of a dark rock, containing black crystals, in a dark paste, rendered still darker by the oil, with which the pillars appear to be constantly rubbed. Buchanan thought these spots were dark crystals of basaltine, or augite, imbedded in the hornblende; and Dr. Benza, who subsequently visited the locality, is also of this opinion, adding moreover, that the hornblende rock of the dykes, in the fosse of the fort just described, is identical with that of the pillars. We are, however, informed by Buchanan, that the rock, from which the pillars are cut, was brought from Cudhully, near Turivicary, about fifty-two miles N. E. from Seringapatam.

After a careful examination of the pillars in the mausoleum, and a fragment of them given to my friend Captain Allardyce, by the mullah of the mosque, and of the rock in sitû at the quarry of Cudhully, near Turivicary, from which it was cut, during a subsequent visit to this part of Mysore, I feel assured that the hornblende rock of the dykes at Seringapatam, and that composing these beautiful columns, are by no means identical. Had they been so, the natives would not have gone fifty-two miles to quarry stone, which might have been procured on the spot. The Cudhully rock, and that of the pillars, is composed of a dark talcose paste, imbedding black crystals of a mineral, strongly attracted by the magnet. This paste is sectile, and infusible per se before the blow-pipe. The hornblende rock of the dyke on the contrary is hard, and fuses into a greenish black glass: the imbedded crystals of this mineral, decomposing, often fall out, imparting a variolated appearance to the surface. The geological situs of the talcose rock will be described in a future paper; suffice it to observe that it is associated with the talc slate.*

The Cauvery river.—The Cauvery at Seringapatam, during the rains, is a deep and rapid river; but easily fordable during the dry season: the bed is rocky and encumbered by large fragments of granite and gneiss. Its bed cannot vie with those of the Kistnah and Godavery, in precious stones, corne-lians, agates, &c. Granite, greenstone, and gneiss, imbedding corundum, and, though rare, the ruby, with its associated schists, are the rocks generally passed over by its waters. Garnets and iron ore are, however, frequently found in the bed; corundum seldom. This beautiful and sacred stream takes its rise among the Coorg mountains, and traverses the peninsula in an easterly by southerly direction. After watering a large part of Mysore, it descends into Coimbatore at the falls of Sivasamudrum, and, passing Trichinopoly, disembogues its waters through various channels into the Bay of Bengal, between Porto Novo

* See note on this subject at the end of this Journal.—*Editor.*

and Adrianpatan. It contributes immensely to the fertility of the countries through which it passses; its waters are conveyed into the fields principally by means of water-courses, and anicuts, constructed at a vast expence by the Hindu princes of Southern India. Two crops of rice are, in general, annually produced on its banks, besides large quantities of most excellent tobacco, sugar-cane, &c. The soil brought down by it is a fine rich clay, produce of the disintegration of the rocks over which it passes, and often mingled with a considerable portion of carbonate of lime, deposited by its waters, and decayed vegetable matter. It is navigated principally by basket-boats, and conveys the produce of Salem, Coimbatoor, and Trichinopoly to the sea.

Having reached our southern limit, we will now return northerly towards the Tumbuddra, by a different, though almost parallel, route, lying to the east of that just described.

From Seringapatam to Bangalore the formation is principally gneiss and hornblende schist, penetrated by veins of actynolitic and chloritic felspar. The rocks in the vicinity of Bangalore are granite, gneiss, and greenstone, in dykes, penetrating them generally in a west to an easterly direction. Tabular masses of a lateritic rock overlie the gneiss, a little to the N. W. of the cantonment. Passing from Bangalore, the geology of which I shall have occasion to notice in a subsequent paper, the road lies in a northerly direction, towards the celebrated stronghold of Nundidroog.

Nundidroog.—Gneiss, with a few clusters and detached hills of granite rising above the undulating level of the table land, are met with. The soil is generally a bluish red, loamy clay, and a quartzy detritus, abounding in ferruginous nodules—debris of the lateritic rock, which is seen on the surface in scattered patches. Near Yellavunkah I observed a mass of it covering the surface of the road, and again noticed it near Nundidroog, where it was partially employed, with other stones, in the construction of a bund of a tank. This contained much less quartz than the former, nor was it so porous. A little north from Deonhully, a hill, principally of gneiss in contorted strata, is seen, with a nearly north and south direction. Its southern extremity is crossed, from west to east, by two basaltic greenstone dykes; the first of which bifurcates on entering the hill from the west: the larger branch pursues its course through the hill without much interruption, and sinks beneath the surface of the soil on the opposite or eastern side. Its breadth is from 15 to 20 yards. The rock through which it passes, particularly on the left side of the dyke, where it has a scarp of above eight feet high, has the appearance of a channel cut in the rock. The left branch of

the bifurcation gradually diminishes in width, till it finally disappears in the substance of the rock, after performing an easterly course of more than 200 paces. The second stream is not so wide as the first, and passes through a higher part of the hill. After cutting the summit and giving off one or two minor branches, it separates into a number of ramifications, which spread out, become thinner and shortly disappear. They sometimes cease abruptly, and re-appear at short intervals. Short parallel veins are observed at a little distance from, but having no connexion with, the main stream. These facts, which I have observed in other parts of India, and the disturbance observable in the rocks in which these dykes intrude, incline me to the belief, that the primitive rocks, in which they are found, must have been in many cases, riven in a nearly solid state by a force from below, the vibrations of which proceeded nearly at right angles with the poles of the earth, and thus formed vents for the liquid basalt, struggling up from beneath. That the imbedding rock is not contemporary, and did not exist in a state of fusion with the basalt, is indicated by the wall-like escarpments, cut shear, as if by the chisel, through the former, into conduits for the escape of the latter. There is here no passage of the one into the other; a decided line of demarcation exists throughout. Veins of quartz and felspar existing in, and apparently coeval with, the granite itself, are seen divided by the basaltic stream, and solid fragments of the former imbedded in its course. Others, still larger, are frequently entangled between the ramifications of the basalt; and, in detached blocks, occasionally resemble a vein of granite in the basalt.

In conclusion of these remarks, I may add that, in dykes of considerable width, both sides of which are bounded by walls of granite, the latter rock becomes altered, as though by igneous agency, whilst the former, on its approximation, becomes compact and comparatively dull, the consequence of sudden refrigeration from coming into contact with the granite. Towards the centre of the dyke the basalt becomes more granular and crystalline, and sometimes porphyritic, imbedding crystals of a greenish felspar: acicular crystals of augite occur in both. The surface has a slightly blistered appearance. Where basalt is found encrusting gneiss, its edges are found graduating into a thin coat of greenish eurite, the surface of which is frequently vesicular, the cavities containing a yellowish brown powder. This euritic basalt acquires a greyish green hue, imbedding small crystals of epidote and frequently yellow iron pyrites. It also retains a portion of the augite; exchanging the dark crystals of hornblende for the light green epidote. Angular masses of dislocated granite, with fragments of the basalt adhering

to them, are frequently found in the vicinity of these dykes. The deep vertical fissures, we often see cleaving from summit to base whole hills of granite, divide also the basaltic veins. At what period these fissures and dislocations have occurred—whether from foreign disruptive causes, or from that spontaneous separation, to which it is well known granite is subject, is difficult to determine. It seems certain that they are posterior to the irruption of the basalt.

The rock of Nundidroog rises to the alleged height of 1,700 feet above the surface of the plain, at the southern termination of two ranges of hills. The western range has a N. W. direction, the eastern proceeds nearly due north, until it approaches Purniah Chatram, whence it bends its course to the N. N. E. to Worralconda. From Worralconda it extends northerly to Sondoo; thence sweeping to the N. W. it enters the Ceded Districts. A range is observed some miles to the east of Purniah Chatram, which has hitherto a N. E. direction, but here bends towards the west. The valleys, as in the Nundidroog range, appear to cross the line of direction, their course being nearly east and west. A hill called Chinna-raya-conda, a little north of Nundidroog, and the next in the range, was pointed out to me as the site of the sources of the rivers Pennaur and Palaur. The former takes hence a northerly course, and falls into the Bay of Bengal, near Nellore. The latter pursuing a southerly course to the east of Bangalore, adds its waters to the ocean near Sadras. This fact, if it does not prove this to be the highest part of the table land of Mysore, demonstrates the descent of the land hence to the north and south.

The hill of Nundidroog is a mass of granite, on the sides of which rest blocks of the same rock, and dislocated masses precipitated from the summit. Among them are occasionally seen globular and angular blocks of trap, indicating the vicinity of a dyke. At the base granitoidal gneiss is seen near the summit, impending cliffs of granite and sienitic granite rise to the apparent perpendicular height of 60 or 70 feet above the rest of the rocks, cleft by vertical fissures, and without the slightest appearance of stratification: this rock contains both a brownish and white felspar: a small grained sienitic variety with a light green chloritic hornblende also occurs. But the variety which predominates has crystals both of a translucent (albite) and opaque whitish felspar; the latter projecting on the surface give the rock a peculiar white mottled appearance. Porphyritic veins imbedding large crystals of foliated felspar, with plates of a dark green mica, intersect this last rock.

Worralconda.—From Nundidroog the road passes through Purniah Chatram and Worralconda, along the eastern flank of the Nundidroog chain, some spurs from which are crossed *en route*. The Meta-Meyre-cotta ranges lie some miles to the right. The formation, as far as I was enabled to judge from the examination of the spurs just alluded to, and of some detached masses, and the appearance of the peaks of the highest hills, is similar to that of the hill of Nundidroog. Several greenstone dykes cross the plain, from west to east, between the two ranges. One, close to Worralconda, has a northerly direction. I followed its course some distance beyond the village, in the expectation of seeing it unite with a large westerly dyke, of which I supposed it to be a branch, but was disappointed by its dipping beneath the soil, and thus eluding my search. Retracing my steps south of the village, I had the satisfaction to see this surmise verified by its joining the main westerly dyke. Ascending a large mass of granitoidal gneiss composing the Worralconda hill, I observed another, but smaller dyke traversing the rock in the same direction. This also joins the main dyke a little south of the hill —it exhibits brass-coloured pyrites, and needle-shaped augite crystals. Flanking the larger dyke, beds of both a red crystalline and compact felspar occur, with quartz and thin veins of chlorite, as well as a greenish eurite which appears to owe its colour to epidote. This eurite graduates into basaltic greenstone, like that of Deonhully. Magnetic iron sand is obtained from the beds of the nullahs in this vicinity, and indeed, throughout the taluk, and smelted.

Baugoopully.—The Nundidroog range appears to terminate a few miles N. of this place, as the Polla range on the right is approached. Several trap dykes stretch across the plain, between the two ranges, with an easterly direction. One of them a little to the west of the deserted village of Mangsundrum, gives off branches to the north and south. The latter throws off a vein, which, entering into a convex mass of gneiss, spreads out into numerous, and occasionally intersecting, ramifications. About a mile south of Baugoopully the plain is strewed with bits of ferruginous quartz, reddish felspar, with fragments of a compact actynolitic vein: a little farther on, the latter is seen in the bed of a nullah, partly lying in lamellar masses on the top of weathered gneiss, and partly in thick veins, running a W. N. W. direction, and having a dip of about 40° to the south. Between it and the gneiss, I observed a layer of a reddish felspar and quartz, varying from half an inch, to several feet in thickness. This frequently becomes veined with the lively green of the actynolite, and acquires a schistose character. The actynolite rock, *vice versâ,* imbeds crystal of a flesh-

coloured felspar, forming an elegant porphyry. Green mossy looking crystals of actynolite may be seen between the porphyry and the embedding felspar rock. Veins of a transparent quartz intersect it, and near them occur imbedded cubic iron pyrites; iron ore in reddish octahedral crystals also occurs. The rock imbeds pure actynolite, in long striated diverging crystals, filling up small cavities, and shooting out on the surface. The rock is remarkably tough, heavy, generally crystalline, but sometimes compact as eurite; translucent slightly at the edges, fracture uneven. The superincumbent soil is red; beneath it is a detritus of ferruginous quartz pebbles, pieces of actynolite slate, felspar, pisiform iron ore, and a few rounded fragments of basaltic greenstone, which exfoliate in concentric layers. In most of the fragments, even in the gneiss itself, I observed a tendency to assume a pentagonal and hexagonal form. I also picked up a crystal of corundum imbedded in a brownish talc. A greyish brown kanker is found on the banks of the nullahs.

Close to this place, crossing the rocky hills from east to west, I observed a broad dark band descending the hill side, which I took to be a basaltic dyke, since directly west of it we crossed one in the plain, exactly in the line of its direction. This I found to be the case on ascending the hill, which was composed of porphyritic granite, in large unstratified masses, with crystals of a magnetic iron ore disseminated, generally grey, but sometimes imbedding shining crystals of red felspar. The summit is crowned by vertical masses of this rock, having a tendency to exfoliate in thick layers. Near the base is a convex mammillary mass of the same rock, in which the crystals of felspar and nests of mica had a nearly common direction viz., north and south, following the line of elevation of the hill itself. The dyke of basalt passes completely over it, at right angles with its direction, and is seen crossing the plain on the other side to the eastward. Its breadth at the base of the hill is about ninety paces, and at the anticlinal line of the ridge about seventy. Over the southern extremity runs another dyke, or a branch of the one just described, of much less width. Both are distinctly visible at a considerable distance passing through the grey cliffs like the dark stream of a muddy cascade.

From Baugoopilly to the frontier of the Ceded Districts, the formation is gneiss, crossed by numerous basaltic dykes, throwing off ramifications to the north and south. Flanking the dykes are seen veins of the red felspar and quartz rock, imbedding actynolite slate, and the porphyritic actynolite. The gneiss strata are nearly vertical; general direction north and south. It is interstratified with the micaceous hornblende schist, and intersected by pegmatitic veins of red felspar and

quartz. A magnetic iron sand is found in some spots on the road in the vicinity of the trap dykes, which has probably resulted from their decomposition. Most of the basaltic greenstone found here slightly affects the magnet.

Palsamudrum.—From the Mysore frontier to Palsamudrum, the formation is thick bedded, or granitoidal gneiss, in highly inclined strata. Masses of granite occur detached, precipitated apparently from the peaks in the vicinity. The gneiss is intersected by basaltic greenstone dykes, running generally in an easterly direction, from the Polla range on the right, across the plain, towards some outliers of the Nundidroog chain on the left or west. A few of these dykes take a north and south direction, but appear to be ramifications of the former. Veins of actynolite slate, generally flanked by pegmatitic beds of a red felspar, with a transparent quartz, traverse the gneiss in the neighbourhood of the greenstone dykes, with whose direction they in a great measure conform. Kanker is seen in compact nodules, both of a grey and reddish colour, on the banks of the nullah; and, though rarely, forming small mammillary mounds, apparently around the mouths of the extinct or dried up springs by which they probably have been deposited. A few miles south of Palsamudrum, flanking the greenstone, I observed some angular blocks of sienitic granite, consisting of an opaque felspar imbedding crystals of schorl, with a little grey quartz.

The basaltic greenstone in every way resembles that of Baugoopilly. The augite crystals on the surface decay into a reddish white earth, which, falling out, leaves the cavities observable on the surface. Crystals of felspar imbedded in it are subject to similar decay, leaving larger cavities. Magnetic iron ore, in crystals, is found in most of the rocks of this place.

Terimany.—From Palsamudrum towards Jaulipett, the road lies principally through a valley between two short ranges, apparently of gneiss and granite, which run in a north and south direction. The valleys or breaks form acute angles with the line of direction. The hills are rocky masses, covered with their own exfoliated fragments, and destitute of vegetation, save a few bushes principally of cacti, euphorbia, and mimosa. Emerging from the valley a little south of Jaulipett, the indented outline of a long range to the west, pursuing a parallel course to those on the east, appears on our left, at a considerable distance. Spurs from both ranges are thrown across the plain, and form partial barriers. North of Jaulipett, the eastern range terminates in the rock of Pennaconda, about a koss and a half from Goghirry. A few detached outliers continue nearly to Terimany. The western range still bounds the horizon to the left, preserving a deeply indented outline. The gaps in both the ranges seem to have a parallel direction. Indications of

the regur appear in this vicinity, and abundance of a whitish grey kanker. Gneiss, interstratified with micaceous hornblende slate, is the principal rock found in the valley, and on the plain. Strata nearly vertical —direction northerly—dip to the east. In a nullah near Somundapilly, is a bed of gneiss, with actynolite in tabular friable crystals, with the usual band of felspar and quartz intervening between it and the gneiss; the latter rock in the vicinity of the bed is contorted. A dyke of basaltic greenstone running east and west was not many paces distant. Both this rock and the actynolite are not so often seen.

Magnetic iron sand, is procured in the neighbourhood of Paupreddy, a village about five miles from Palsamudrum, and there smelted. I saw only one furnace, which is of much smaller dimensions than those at Kootul in Mysore. There are furnaces, I am told, at Niddamaumri, in the adjoining taluk of Pennaconda. I observed a few patches of regur in the low grounds about Jaulipett. The gneiss, about this place, where it has been penetrated by the basaltic dyke, is solid and compact, resembling close grained granite. A greenish eurite in thin veins traverses many of the blocks, giving them a schistose structure.

The gneiss frequently imbeds large crystals of a white felspar, which impart to the rock a porphyritic appearance, singularly contrasted with its own lamellar form, and can scarcely be judged of in a hand-specimen. A greyish white, and rather friable kanker, is found at a little distance beneath the surface, in beds about a foot deep, and penetrating the subjacent gneiss. Near Raichoor I saw a rude stone and clay furnace for burning it into chunam, about four feet high and 20 inches in diameter. Salt-pits are excavated on the banks of the nullahs. N. E. of Goghirry at the foot of the hill of *Shah-durgum*, lies a low hill, crested with dark looking rocks, visible at a great distance, which are easily recognized to be part of a basaltic dyke. It is shortly afterwards crossed about half a mile to the east of the hill, and is about 30 paces broad—direction, east. Two others of less dimensions are crossed shortly afterwards: they have a similar direction. Fragments of actynolite slate are frequently picked up, and it may be seen in thin veins traversing the red pegmatite. A section of a well at Terimany, about 25 feet deep, presents the following strata: 3 feet gravel; 4 feet grey earth; 18 feet beds of red felspar and quartz, with decaying greenish earth, and friable kanker in veins and fissures.

Gneiss is, as before remarked, the prevalent rock: at the same time it must be observed, that blocks of granite, and a red quartz rock, resembling that cresting the sandstone and clay slate formation of Cuddapah, are seen in the walls of the fort and choultry, probably brought from the range north of Anantipur, which appears to be a continuation of the sandstone ranges of Gooty.

Peroor.—At Peroor, a village situated upon the eastern bank of the Pennaur, the range on the right ceases altogether, while that on the left or west (the Condaganpilly range), wears a smoother aspect, and turns off to the west. The quartz rock mentioned at Terimany, here occurs in sitû, in a bed of a nullah, a little to the east of the fort: it rests uncomformably in almost tabular masses on the surface of the gneiss. It is both massive and schistose, according to position; massive when seen in blocks protruding from the surface of the soil, and schistose, generally, when found in contact with the gneiss. A thick bed lies at the bottom of the nullah. In structure it varies from that of gneiss, to that of the red granular quartz rock of Cuddapah, and contains but a minute portion of mica. The gneiss is generally much weathered, and abundantly seamed by incrustations of kanker. Its strata are not so much inclined as hitherto, having a dip of about 25° to the E. S. E.—direction as before. Beds of the micaceous hornblende schist are seen, commonly with the same dip and direction as the gneiss. The greenish eurite and accompanying pegmatitic veins, like the basalt, frequently intersect the line of direction at considerable angles. They are of more recent date than the quartz veins, as is shown by their passing through them. At the points of contact, faults or dislocations are sometimes seen in the latter; an instance occurs in the gneiss of this nullah. The dislocation is of a few inches, in a W. N. W. direction. Granite is still seen in detached masses. Beds of the micaceous hornblende rock are observed in the wells, disintegrating into a greenish friable substance, and exhibit various stages of decomposition in the same mass. The mica is seen more distinctly in the decayed portion; it changes to a silvery brown which gradually loses its brilliancy. The hornblende decomposes with the felspar, into a light dirty green friable rock, mottled with ferruginous spots. Probably the hornblende is combined with actynolite, which not only gives the rock a schistose character, but imparts much of the green in decomposition. The eurite near this mass does not appear to be in the slightest degree altered. This rock, like basalt, is more crystalline in the middle of large veins. In small veins it becomes compact, heavy, extremely tough, and shows a disposition to split into rhomboids. Crystals of epidote occur in the gneiss near the greenstone dykes.

Rampur.—This place is situated on the right, or western bank of the Pennaur, which is here upwards of 200 paces broad, taking a bend to the east. Its bed is of sand, from which the subjacent gneiss and micaceous hornblende slate occasionally protrude. The surrounding country consists of undulating plains, interspersed with a few scattered

hills. The ranges running to the north are no longer visible, except a few peaks above the western horizon. The formation is much the same as at Peroor, but the micaceous hornblende schist is more abundant. Fragments of schist, felspar, and ferruginous quartz cover the surface. Among the debris I picked up several bits of a ferruginous jasper, and potstone, translucent, of a faint green, and imbedding plates of mica. Potstone is said to be dug, not very far off, at a place called Reddorpilly, in the Durmaveram taluk. A hill of gneiss, about one and a half mile in a north west direction from the village, is intersected and entangled in a singular manner, by two basaltic greenstone dykes, or the branches of a very large one having severally an east and an E. N. E. direction. I observed two of the ramifications cutting through beds of the micaceous hornblende schist. The mica and felspar of this rock are altered by contact, much in the same manner as granite and gneiss. The gneiss of this hill contains both red and white felspar, and large nests of glittering micaceous hornblende, veined by the red felspar. Porphyritic veins of this mineral with translucent quartz occur, having crystals of a highly magnetic iron ore disseminated. Some fragments of gneiss have a schistose appearance, from the presence of actynolite or crystallized talc, or both. Talc in its crystallized form imparts a schistose structure, as before observed: and in its earthy form, it softens the gneiss, gives it a green tint, and a slightly greasy feel. This may be observed in the fragments in the walls of the fort.

Gollah.—Formation same as at Rampur; between it and Gollah one or two basaltic dykes are crossed, which, with a single exception, had an easterly course. Natron occurs in the beds of the rivulets, and a quartzy magnetic iron ore is found imbedded in the micaceous hornblende schist: the latter is smelted at Almireddypilly, and at four or five other places in this taluk (Durmaveram). The wrought iron sells at about 2 rupees 6 annas the maund of 48 seers, each seer weighing 24 rupees.

Bellagoopah.—This place is interesting on account of the great regur plain of Bellary having its commencement some distance to the S. E. of the village. Hitherto it has been seen only in detached patches, generally occupying banks of rivulets, and other low grounds: now it occurs spread out in one vast and almost uninterrupted level sheet, extending in all directions from the edges of the detrital soil, that forms a broad belt at the base of the hills to the westward.* The interruptions of the regur, when they do occur, will be found generally on the summits of the rocky swells, which are covered with a red

* The *jatropha glandulifera,* a low shrub, almost peculiar to the regur, is now more frequently observed.

soil arising from the detritus of the subjacent or protruding rocks. About 2 miles west of Bellagoopah, are two long hills, running nearly parallel to a broken range at a considerable distance to the west, with a W. N. W. direction. These hills are the last that appear in view; beyond them extends one broad expanse of plain. They are of gneiss with red felspar, and a hard dull mica: both white quartz and felspar occur: the red however, gives the general colour to the rock. Thin actynolitic veins are seen traversing it, though rarely. A basaltic dyke passes through the northernmost of the hills in an easterly direction. It has a dull green tint and imbeds iron pyrites. The hematitic and granular iron ore are scarcely seen, and the natron deposit becomes rarer. Common salt is got in abundance; both this, chunam, and saltpetre are manufactured at a village at a short distance hence. A loose block of a dark dull siliceous green rock, with waving lines of a light colour through its structure, occurs in the plain.

Regarding the manufacture of saltpetre, the natives of the locality were a little delicate in furnishing me with information. At first they said it was brought from the jungle, together with the earth from which common salt is washed. Next, that it was not procured from the jungle at all, but on the spot: and then that it was never to be found but in and about villages. On enquiring the reason for this, they gave evasive answers, but at last reluctantly confessed that it was got from earth saturated with urine, and other animal matter; which, with ashes and other refuse, are thrown together and allowed to remain till, I presume, the nitric acid produced by the decomposition of the animal matter combines with the alkali of the wood-ashes, and produces an impure nitrate of potash—the saltpetre of India. The process is something different to that for obtaining muriate of soda. The mass of earth is washed with water; which, after dissolving its saline contents, is evaporated to a certain extent by boiling. The solution of a dirty brown colour, is then poured into a cistern lined with chunam. Small branches and bushes are put in, on which the salt crystallizes. They are then taken out: the salt separated, either washed and re-crystallized, or dried for packing. It is sent to the Bellary and Madras bazars.

The direction of the strata at Bellagoopah is N. N. W—dip of 25° to the N. E.

Honoor.—The sections of the soil in the rivulets near this show a stratum of regur from 2 to 5 feet in thickness, lying on gneiss, micaceous hornblende slate, or the pegmatitic beds enclosing veins of a greenish eurite. In a bed of a rivulet I observed a basaltic greenstone dyke,

cutting through the gneiss, and the micaceous hornblende slate in an easterly direction. That of the gneiss and schist was here nearly N. W. The basaltic greenstone divides into its usual rhomboids, which again separate on percussion, exhibiting a hard globular nucleus. Furnaces for expelling the carbonic acid of the kanker, and reducing it to lime, are seen on the beds of the rivulets.

A little south of Honoor are the dunes described in the 23d No. of this Journal.

VIII.—*Essay on the Creed, Customs and Literature of the Jangams.*—*By* C. P. Brown, *Esq.*

The various Braminical creeds prevailing among the Hindus, as well as those of the Jainas and Buddhists, have been amply illustrated by Colebrooke, Wilson and other learned writers. It remains to enquire regarding the anti-braminical worshippers of Siva, who are called *Jangams*, Vīra-saivas, or Lingadharis, who are easily recognized by their wearing a small idol, either hung on the breast or bound on the arm. These are the disciples of Basava whom they regard as a form of the god Siva. They are widely spread throughout the South of India, among the Canarese, the Telugus and the Tamils.

Dr. Francis Buchanan, the Abbe Dubois, and Colonel Wilks have given short notices regarding the Jangams, which are summed up in Professor Wilson's Essay on Sects, in the seventeenth volume of the Asiatic Researches. But the information collected regarding the Saivites being far from sufficient, the learned professor did me the honour (when I was his guest at Oxford, in 1836) to desire me to obtain further information on points which remained very uncertain for want of sufficient enquiries made in the peninsula of India. On returning to Madras, I accordingly resumed an enquiry regarding the Jangamas, the only saivite sect who deviate from braminical usages.

Among Bramins the Smartas (followers of Sancar Achari) are generally called saivites, but are in fact free-thinkers, equally willing to adore Siva and Vishnu. Their creed may be found in the Mahabharat, the Bhagavat and the Rāmāyan, all of which are entirely rejected by the disciples of Basava. There are indeed, some few Siva Bramins who officiate as priests in the Siva temples, but I have not heard of any peculiarities prevalent among them. They certainly are different from

the Smartas, who refuse to receive the holy water and rice (tirtha prasād) from their hands.

The Vīra-Saivas are divided into two sects: one is semi-braminical or high-church, called A'ra'dhyas. The other is anti-braminical, and is called Jangam. The Aradhyas claim to be descendants of saivite bramins, and between them and the Smartas there is a certain degree of reluctant intercourse: founded upon the rites of initiation (upanayanam) which both parties use.

A brief outline of its history will enable us to understand the present state of the Vīra Saiva sect: this is amply narrated in their poetical chronicles, written in Canarese and Telugu. When divested of fabulous decoration it seems that their creed was found by Basava, whom they adore as their one deity: looking upon him as an *avatar* or incarnation of Siva, the god of this creed.

Basava was the son of a Saivite* bramin, named Mandenga Madamantri, at Hinguleswaram, a village near Bagwari in Belgaum, in the Southern Mahratta Country. When he was a boy he refused (they allege) to wear the braminical thread, because the rites that confer this mark of *initiation* require the adoration of the sun in the manner prescribed by the Vedas. Perhaps in truth he did assume it, but if so, he subsequently renounced it. Shortly after this time he escaped from his parents, and accompanied by his sister Acca Nagamma, he fled to *Calianam* or Kulyan,† the capital of the Carnataca country, where the reigning prince (A. D. 1155 circ.) was Bizzala or Vijjala, a Jaina by religion whose minister a bramin, was Basava's maternal uncle: he bestowed employment on Basava,and ultimately gave him his daughter in marriage.‡ At his death Basava succeeded to his office, and gradually usurped great power.

It would seem that at this time he began to compare the opposed statements of Jainas and Bramins: and perceived that both creeds were

* The Aradhya bramins pretend that his father was an Aradhya. This the Jangams deny, asserting that the title Aradhya was assumed only when the bramin rites were renounced, and we no where find Basava denominated as an Aradhya.

† See Mr. Walter Elliot's Essay in the Madras Journal for 1838, page 212, or in the Journal of the Royal Asiatic Society 1837 No. VII. p. 22, wherein it appears that some of the names herein mentioned are differently written in different Telugu and Canarese authors. Compare also the statements made by that zealous and intelligent antiquarian Lieut. Newbold, in his report upon the Southern Mahratta Country, printed in Pharoah's Madras Almanac for 1840, page 352. Calyanam is in the Nizam's country, 35 miles W. by S. from Beder. For this and a few other notes, I am indebted to Lieut. Newbold, who did me the favour to peruse these pages.

‡ This proves, in my opinion, though opposed to that of his followers that he did not lay aside the braminical thread in childhood. For had he done so no bramin could have given him his daughter in marriage.

idolatrous. It is also possible that an observation of the Christian faith in the neighbouring country of Malayala may have led to his seeking a better creed. At all events he determined on getting rid of the braminical priest-craft, and accordingly refused to worship any deity but Siva, whose image, the lingam, is the most ancient idol known among the Hindus.

This symbol is as separate from indecency in the Hindu mind as circumcision is in the Mahomedan mind. The Bramins with their usual love of filth have connected a variety of obscenities with the linga worship, but these are wholly unknown to the Jangams who look upon this idol just as the catholics do upon a reliquary, with deep veneration

> Hanging a golden stamp about their necks
> Put on with holy prayers.
>
> *Macbeth*, iv. 3.

The image erected in the Saiva temples being denominated Sthavara Lingam, or the stable image, he denominated this reliquary the Jangama Lingam or Locomotive image: a phrase borrowed from the Vedas, where it is used for living being. Hence he and his followers are denominated Jangams, or living images of the deity.

Before we proceed to describe his doctrines, we will give in a few words, the rest of the history of Basava, still referring our readers to Mr. Elliot's Essay (which gives the Jaina account), and to the Basava Puran which relates the story as told by the Jangams.

Basava's determined opposition to the Saivite Bramins and to the Jainas raised him many enemies: while his bounty to the poor gained him friends equally numerous. At last the prince's jealousy was roused, and a civil war ensued wherein Bizzala was slain A. D. 1168*, and this event was soon succeeded by the death of Basava who, according to his followers was " absorbed into the image" or vanished: while the Jaina account declares that he fled to Capila Sangam where the Malparba and Krishna rivers meet, about 104 miles west of Bellary.† This event was coeval with the murder of St. Thomas a Becket.

The name Basava is a very common one among Hindus: the Jangams have taken occasion from their teacher having borne it to feign that he was an incarnation of Nandi or Basava (the Apis or bull appertaining to Siva or Osiris), and this has been the source of numerous idle legends on the subject.

* For this date I am indebted to Mr. Elliot who ascertained it since the publication of his Essay. It corresponds with the Saca year 1090.

† See Almanac as above, page 354.

At his death his nephew Chenna Basava became the principal teacher of this sect, which has in the following six centuries spread very widely among the Canarese, Telugus, Tamils and Mahrattas. The books concerning this sect were originally written in Canarese, but have been translated into the languages now named. Those which I consulted are written in very elegant Telugu verse.

By perusing their books and observing their customs, we may plainly see the grounds of that hatred in which Bramins hold the Jangams.—Their leader Basava was the resolute opponent of every braminical principle. The Bramins inculcate the adoration of many gods. He declared that there is one sole deity. They venerate goddesses and subordinate beings. They reverence cows, hawks, monkeys, rats and snakes. They use fasts and feasts, penance and pilgrimage, rosaries and holy water. All these he renounced. He set aside the Vedas which they venerate. They declare Bramins to be literally gods upon earth, women to be vastly inferior to men in all things, and parias to be utterly abominable. Basava abolished these distinctions. He taught that all men are holy in proportion as they are temples of the great spirit; that by birth all are equal; and among those whom the Jangam books describe as saints, we find not a single Bramin but many parias and many women. In the braminical writings, the gentle sex are usually treated in a manner abhorrent to European feelings. But in the Jangama books we find a very different temper. Here we find woman raised to her proper station in society, such as she holds among Christians, being treated honourably with a respect and delicacy which form a strong contrast to the modes of expression we find in the braminical volumes.

Indeed the considerate and decent behaviour of the Jangams toward the female sex, is a very pleasing peculiarity which entirely divides them from other classes of Hindus. A Jangam once pointed out to me that the manners of the native Christians towards women exactly resemble those of the Jangams. In the eighth chapter of his work, the Abbé Dubois has spoken with indignation of the impure customs, as he calls them, of this sect; but strongly as he speaks against Bramins he evidently wrote under their influence; and in thus condemning the Jangam customs regarding women, he omits to observe that in these very respects Christians are equally reviled by Bramins: who certainly are much more scrupulous in their pharisaical precision regarding the outside of the cup and the platter than are either Christians or Jangams.

The following particulars regarding marriage, may give some insight into the social state of the Jangams.

The forms of contracting marriage are the same as those which are used among other Hindus. Certain prayers *(mantram)* are read, and the *tali*, or bit of gold, is attached to the bride's neck as usual.

But it is not imperative to betroth the parties in childhood, as is the rule in other castes. The Aradhyas adhere to the braminical rule, but the other castes of lingadharis often let the wedding or betrothment take place after the bride is grown up. Like other Hindus they permit polygamy, if the first wife be childless. But the second nuptials cannot take place without her consent.

Marriage is imperative among Bramins. It is merely voluntary among the Jangams.

A widow is treated with every sort of kindness and respect. Her head is not shaven, and she is permitted to marry again.

The Bramins exclude a widow from society. There is no such prohibition among the Jangams: who however, agreeing with others of their fellow countrymen do not permit her to wear the jacket, perfumes, paints, black glass bracelets, the nose-ring and the silver toe-rings: for these form the specific garb of a wedded woman. But in various tribes of Lingadharis some of these rules are laid aside.

A woman of piety is just as fit as a man to confer instruction in the creed. The Jangams always receive and return the bow or salutation of every woman, just as happens between man and man. For, they observe, were we to offer her any insult it would be an insult to the image of the god which she wears. Nothing but a breach of chastity can lose her the title she possesses to gentle and honourable treatment.

On Sects in this creed: and rules in regard to Eating.

Though the Vīra Saivas declare themselves entirely free from the bonds of caste, we shall perceive that their liberation is but partial.

They cannot eat with any one who refuses to bless the food in the name of Basava: for they look upon others as heathens.

And they refuse to eat with an Aradhya, because being a Bramin he is an idolater in their eyes by reason of his prayer (gayatri) addressed to the sun. For the solar worship is an essential part of the braminical creed.

And the Aradhya, as he refuses to lay aside his caste cannot of course eat with men who eat with parias. Thus each sect is equally unwilling to admit the other to equality.

In other sects of Hindus, the Bramin takes precedency, and is allow-

ed every honour. In this one he is looked upon as an inferior, and as only a pretender to being in the faith.

To this subject we must return when speaking of the Aradhyas:—meantime it is requisite to point out that the Jangams, who totally reject the Bramins, class themselves as *Sāmānyas* and *Visēshas*.

1. The *Sāmānya* or ordinary Jangam is bound by no vow. He or she can eat flesh* and drink wine: they use betelnut, and can eat in any one's house. Only they are obliged to marry in their own caste.

2. The higher grade, opposed to this is the *Visēsha* or extraordinary: being the guru or teacher, commonly called Matādhipati or spiritual guide. All the rest are his disciples. He or she acquires this rank by taking a vow, the *greater* vow; which will be afterwards described. Any man or woman who is moral and devout is admissible to this rank: which entirely releases them from caste.

Further there are two classes of (bhacta) "worthies;" who are devotees, but do not as yet aspire to the higher grades.

1. Those (*Sāmānya bhactas*) who retain caste, and in other respects are the same as Sāmārya Jangams.

2. The (*Visēsha bhactas*) confirmed worshippers: these are under the *lesser* vow: which binds them to honour the "Guru, the Lingam, and the Jangam"—three phrases which they use as a summary of their opinions. For they ordain that every honour must be paid to "the teacher, the image, and the brother in the faith." And their bitter foes, the Bramins, acknowledge that the Jangams treat each other as brethren.

These *Visēshas* are entirely free from caste: and as they are found chiefly among the Cannadis, they are generally styled *Cannadīlu*.

Now as to eating:—the *Visēsha bhacta* will not eat in the houses of the lower sect. The Guru can eat in the houses of *Visēsha's* alone; who are entitled to sit with him at dinner. The rest cannot; they therefore sit a little way off. The distinction is that the *Visēsha* Jangams are teachers: and the *Visēsha* Bhactas are disciples.

All can eat in the house of the Visēsha, but *not in each others* houses.

These rules apply to both sexes: for men and women dine together.

Though the Aradhyas are bound to attend funerals, even those of parias, the Jangams (even parias) cannot eat with them even at the funeral dinner.

* Excepting of course that of the cow, which all Hindus look upon as we do upon horse-flesh.

I have mentioned that they bless their meals in the name of their god. The food is polluted if "a heathen" casts his eye upon it *before* it is blessed. But *after* the benediction is uttered they consider the food holy and are bound to eat it: it cannot be defiled by the glance or the touch of any person. Dining is termed *Siva puja*, or worship. For they think, with JEREMY TAYLOR that "God esteems it a part of his service if we eat or drink: so it be temperately and as may best preserve health."

On the Pandarams.

The Saiva worshippers among the Tamils are called Pandarams: these are not Vīra Saivas, nor do they wear the lingam or adore Basava. I name them here chiefly because they are often mentioned as being Vira Saivas whereas in truth they are (like the Smartas) Purva-Saivas, and worship the image of Siva in their houses. In his Essay, Professor Wilson has regarded this sect as Jangams, and has also included under that title the "gangeddu-vandlu" or mendicants who rove about, leading a bull gaily tricked out. But these are mere *Dasaris* or mendicant friars of the Vishnu sect, and have no connection with the Jangams. These may always be known by the bell and the fan they bear, as well as by their elegant dresses and gay appearance. Another Vishnavite sect who are equally opposed to the Jangams are sometimes mistaken for them are the çâtānīs or Sartarnees who call themselves Vīra Vaishnavas. These men lay aside caste but are earnest devotees of Krishna, and accordingly are the firm allies of Bramins.

On "Guru, Linga, Jangam."

These three words comprize the creed of the sect, and evidently were intended to disavow every part of the braminical priestly tyranny.

This mystic phrase is thus expounded. The image (lingam) is the deity: the Jangam is the wearer or fellow worshipper: and he who breathes the sacred spell in the ear is the Guru. Thus he supplies the link between the god and the worshipper, and ever after is looked upon with affection as the true parent: even more respected than the father according to the flesh. For, says the Jangam, I am one with the deity, and he alone is my father who conferred this unity on me.

Among Aradhyas the father himself usually confers the spell: in other castes it is thought improper to be the disciple of one's own father or mother.

The Gurus being devout persons usually separate from secular employment, subsist on alms or free-gifts. But it does not seem to be a

duty to support the guru, or to consult him, and own his authority in ordinary affairs. It is the duty of the Jangam to support and be a son to the guru or father confessor: but the guru never asks alms of those who are not in the creed. Several gurus are employed as paid tutors or clerks among the English, and of course receive wages: which would be unlawful were the employer a Jangam.

These rules regarding initiation are analogous to those used among Musulmans, wherein the teacher is called Moorshud, and the disciple (man or woman) is a Mooreed. The ceremonies used on that occasion are fully described in Dr. Herklots's "Customs of Musulmans," page 282. In each faith love of God, and benevolence towards brethren in the faith are the proposed objects.

Regarding the Aradhyas.

In other sects of Hindus the Bramin uniformly takes precedence of other castes. But among the Vira Saivas he is degraded beneath all others.

Hence there is a perpetual feud between the Aradhyas and the Jangams who (unless at funerals where all are bound to assist) treat these Bramins with contempt.

And as a reason for such behaviour they allege that the Aradhya is an idolater because in assuming the sacred thread he is obliged, in common with all Bramins, to offer adoration to the sun, whereas Basava ordained the worship of God alone.

The Aradhyas also give great offence by affecting a superiority over other castes. The Jangam is bound to be courteous to all: especially to fellow worshippers: and return a woman's salutation or bow just as heedfully as that of a man. But the Aradhya calls himself a Bramin: he salutes none but Bramins, and looks upon none else to be *Jangams* or brothers in the faith. He will not pay more honour to women than other Bramins do. In fact women are not much better off among Aradhyas than among other Bramins. If her husband dies a woman cannot marry again. Certainly her head is not shaved nor is she expected to die with her husband, but even this rite has been very reluctantly laid aside, and some Aradhyas have honestly confessed to me that they much regret the prohibition.

The rites of *prayaschittam*, and other sorts of purification and fasting, are as severely binding on the Aradhyas as on other Bramins. They assert that they religiously adhere to the carma canda, or ceremonial law. But they fail to establish this to the satisfaction of a Bramin.

Another point in which the Aradhyas widely differ from Jangams is their refusal to admit proselytes into their creed.

In the points now described it is evident that the Aradhyas have very reluctantly and imperfectly obeyed the laws given by Basava, who seems to have treated them leniently, admitting them into his creed in the hope that after a while they would be prevailed upon to lay aside the sacred thread, and the worship of the sun which is connected with it.

In course of time many of them have done so: and a guru who is one of my principal informants, is the son of a Bramin (an Aradhya), who saw the folly of caste, laid aside the thread and became a Jangam, wherein his instructor seems to have been originally a paria. But being a Visesha Jangam, of course he now is wholly independent of caste. In Sanscrit scholarship, and particularly in a ready acquaintance with the Vedas he is decidedly superior to an old Aradhya, whom I also employed; who however, is well acquainted both with the Vedas and the Agamas. In the midst of a discussion one day on caste the old man laid his hand on that of the Jangam guru, and said to me, "Sir if I could only lay aside this thread I could go to this good man's house, eat with him, and marry my son into his family!"

In all these discussions I observed that the Jangam treated the Aradhya with kindness, and perhaps pity, but certainly with no respectful deference. A learned Vaishnavite Bramin was present at these discussions, and observed to me that the Aradhya being half Bramin half Jangam was completely placed between two fires: and every concession which in the course of argument he might make to one party enabled the other to disown him.

Indeed so great is the antipathy between Aradhyas and Jangams that they cannot even write to one another: as the ceremonious civility of Hindus would oblige each to use expressions of regard which his judgment or his antipathies would forbid.

According to the Basava Puran and other leading books the Aradhyas manifestly are unsupported in their claims to superiority. For all the various (bhacta) "worthies," or saints, whose faith and deeds are extolled, are parias or shoe-makers, hunters or weavers. Not one of them is a Bramin.

And if they claim rank in consequence of Basava's having been the son of a Bramin this avails them nothing: as he laid aside his caste and became the willing servant of parias. In fact the Aradhyas being only half converts resemble the "Christian Bramins" we meet with at Madras, who are baptized, but continue to wear the braminical thread, and

are as much bound by caste as other Hindus are. Yet they are sincere believers in Christianity, and express a horror of idolatry.

Lastly it remains to speak of "the four Aradhyas" visionary personages of very great importance in the creed, but regarding whom I have not succeeded in obtaining any definite information.

Among Jangams as well as among Aradhyas, at all their various solemnities whether marriage, birth, initiation or funerals, four vases of water are solemnly placed in the name of "the four Aradhyas" or prophets.

These four sages are named R'evan Aradhya, Marul Aradhya, E'co' Rama Aradhya, and Pandit Aradhya. In four ages, it is said, these four successively appeared as precursors of the divine Basava.

And to this slender information only one point is added which is the source of perpetual contention. The Aradhyas claim these sages as being Bramins: which the Jangams deny, saying, these were our original teachers, and could not have disobeyed Basava who abolished caste.

The Aradhyas and Jangams who answered my queries, however frank in other respects are evidently in total ignorance about these venerated characters, who are spoken of in no book that I have met with. The Pandit Aradhya Charitra is named after the fourth prophet, but is merely written in his name, and is acknowledged to be a modern compilation.

The Siddhanta Sikhamani, written in Sanscrit verse on the Aradhya system contains a wild mythological tale tending to represent Revan Aradhya as a human appearance of one of the Pramathas or ministers of Siva. But this book is not considered good authority, and the legend is not current. I am also assured that the details are given in a book (supposed to be written in Canarese) named *Chatur matha Sthala nirnayam*, but I have not met with this book, and my informants know of it only by report.

Perhaps we may reasonably entertain a suspicion that these "four sages" are analogous to the four *peers* of the Musulmans, who are described by Dr. Herklots, in page 287 of his volume already quoted. These *peers* or canonized spiritual guides certainly bear Musulman names, but they play the same part, in the ceremony of making a Musulman *mooreed* that the four Aradhyas do in that of making a Jangam. They too, are described in an apostolical succession, and, to crown the analogy, nothing satisfactory can be ascertained regarding them, notwithstanding the high veneration in which they are held. *De non entibus et not apparentibus eadem est ratio*, and if these personages ever existed among the Jangams, how does it happen that these

four alone, of all the saints, are designated as Aradhyas? I confess that neither the Jangams nor the Aradhyas approve the solution I have here offered, and a decision more satisfactory may perhaps be elicited by further enquiry.

Regarding the Vedas.

It has been stated that the Aradhyas found their pretensions on the Vedas, which as they assert prove their authority as Bramins. To perceive the true value of these claims it may be as well to state the present practice regarding the Vedas; and the following statements are the result of many enquiries, as to the rules prevailing in the Telugu and Tamil countries.

Only a small portion of the Vedas is generally read among Bramins: it is read without the meaning being explained, and is in obsolete Sanscrit. The great rite or sacrifice called yajna is occasionally celebrated among the Smārta Bramins: but this is so rare that my informant never heard of but two instances. The few *Bramins who live by the Vedas* commit twenty or thirty chapters to memory, which are recited at certain ceremonies in weddings, funerals, and yajnas. They never pretend to know the meaning. Ordinary Bramins though taught a few pages of the Vedas at school are not expected to retain this knowledge. From the best information it would seem that not ten Bramins might be found throughout the peninsula who are really skilled in the Vedas. Those recluses who study divinity read various commentaries called *Bhāshyam*. The Smartas read the Sancara Bhāshyam. The Vaishnavas read the Rāmānuja Bhāshyam: and the Madhavas read the Madhva Bhāshyam: each man reading the commentator approved by his sect. Such readers are very few indeed. No man concerned with secular affairs troubles himself with either the Vedas or the comments. So great is the veneration shewn to Sancar Achari that the other commentators even when they oppose his explanations do not venture to name him. Thus we see that the Bramins themselves know just as little about the Vedas as the Musulmans do about the koran.

Among the Jangams and Aradhyas certain *portions* of the Vedas *with the explanation* are much dwelt on. But these are selected for sectarian purposes: to demonstrate that Bramins are in error, and, on their own tenets ought to embrace the creed of Basava. By insisting on allegorical interpretations they pervert the meaning, and cannot very seriously believe what they allege. In fact this device resembles

that of the commentator Hardouin, who attempted to interpret all the Odes of Horace so as to give them a Christian import.

The Aradhyas assert that they are followers of the Veda and the Jangams are (Veda-bahya) excluded from that code. The Jangam replies that all have an equal right to read the Vedas: but that Aradhyas have like other Bramins perverted the meaning of the text.

In fact the Aradhyas merely take refuge in the Vedas from the dilemma in which they are placed by their tenets. Their pretensions to superiority are confuted by the very books that teach their creed: by the Lila as well as by the Puran and the Charitra.

On loss of Caste.

Caste is lost in two ways: by sin and by accident. A full Jangam who breaks his vow by tasting wine or betel-nut is excluded from society: but on expressing due repentance his friends can agree to eat with him, and this completes his restoration: which however, is not granted unless there is the strongest reason to believe he will hereafter be cautious. Instances of such loss of caste are extremely rare.

Even if caste be lost the image is not taken away: for it is always looked upon as a part of the body, and they can no more remove the image than they can cut off the man's hand.

No case is known of the image having been voluntarily laid aside. Accordingly the Jangams declare that no one of their brotherhood has ever embraced the Christian, or the Mahomedan faith.

If caste is accidently lost, prayer and solitude, they say, will restore it.

But they look with horror on the chance of any one accidentally losing the image hung on the neck or arm. They affirm that this has sometimes happened: and of course the loser is instantly devoid of caste.

Now when a person accidentally loses caste among Bramins or other Hindus, the rest immediately turn upon him as fish or savage beasts do on a wounded member of their communities. Their cruel treatment of the sufferer is remarkably opposed to the gentle temper of the Jangam rule. For the Jangam custom obliges them to commiserate the sufferer, to fast and pray with him, until the lost image re-appears in his hand "descending through the air like a bee." An Englishman refuses his belief to the stated recurrence of such a miracle, but both Aradhyas and Jangams unite in assuring us in the strongest terms of this miracle having repeatedly occurred; and they go so far as to declare, that their faith rests on this marvel: and were it ever known to fail, their faith would perish.

On being asked how they would treat the corpse of one who died in such a deserted state they answer that it is a case that never happened, and they cannot say what must be done. As for his soul they suppose but very doubtingly, that it has forfeited immortality and must undergo the Hindu metamorphosis. The same also they say regarding the soul of an infant were it possible that it should be buried or lost in the sea without the performance of this solemn initiation.

Whether the person who has lost the image be an Aradhya, a guru, or a common paria, all castes, including Bramins are bound to unite in the rite of restoration just as all must unite at a funeral.

Regarding their Books.

The books read in this sect were originally written in Canarese, and are of two descriptions. Those universally popular as the Basava Puran and the Prabhu Linga Lila: and those peculiarly intended for Aradhyas, as the Pandit Aradhya Charitra. They generally speak of these three books as "the Puran, the Lila, and the Charitra."

The Arādhyās are very fond of Sanscrit reading: the Vedas, the Gīta (or Bhagavad Gīta), the Nilacantha Bhashyam, the various Agamas and the writings of the celebrated theologian Sancar Achāri, regarding whom the reader is referred to Professor Wilson's Essay on Religious Sects, Asiatic Researches, vol. 17, under the head "Dandis." These are eagerly studied but are not locked up from the people at large. For we shall find excellent Sanscrit scholars among the Jangam gurus, and many who are competent even to convey instruction in the Vedas.

They pretend to found their creed on the venerated Sanscrit treatises now named. But after long enquiry I find that their reliance on these is fictitious. It is easy enough for them to adduce certain texts from these books and the Vedas, on behalf of their creed,* and in particular

* We sometimes find a similar mode of argument in Christian writers. For instance in the VEDANTA RASAYANAM, a well known Telugu poem (in padya metre, in four books), written by Ananda, son of Mangala giri Timmaya, which is a little more than a century old. The beauty and poetical vigour of style exhibited in this work render it very attractive, but in the first book the learned author labours (as does the author of the Charitra) to confute Bramins and other idolaters on their own ground, adducing arguments from the Vedas and Puranas in support of his doctrine. Having omitted to mention this poem in a former essay I will take the present opportunity to describe it. The second book brings the history only as far as the birth of our Lord: having commenced with the Fall. The third gives a brief selection from the Gospels describing the baptism, the descent of the Holy Spirit (whom the poet, using Latin words, denominates *Săncta Spirita*), the temptation, some miracles, particularly the raising of Lazarus; the Last supper: the departure to the Mount of Olives (which the author calls Nandana

in justification of their assuming the name *Jangama Lingam* or locomotive image of the deity. Orthodox Bramins laugh at their pretended proofs; especially at their claiming a right to give a secondary or spiritual sense to particular commands. For instance the *Yajna* or burnt offering ordained in the vedas is by them explained as alluding to "our passions which must be sacrificed."

Another step which gives Bramins no small offence is the plea set up by the Vira saivas to superior orthodoxy. For these hereticks assert that they merely revert to the primæval faith which the Bramins have perverted, and they very benevolently try to recal the Bramins to the right way from which they have erred. In the Pandit Aradhya Charitra, the author has laboured to convince Bramins from their own puranas that they are in error and that they ought to embrace the Vīra-saiva creed. Such ratiocination is absurd enough when we consider that Basava set out by entirely setting aside braminical authorities.

The Purana and the Lila were originally written in Canarese, and have been translated into Telugu and Tamil. It has also, I hear, been written in Mahratta, in prose as a catha or story. The purana is an amusing composition, and particularly pleasing to one who has read *usque ad nauseam* in the braminical books. The Lila is in quite a different vein and vastly superior. It is an allegorical poem of considerable beauty, and is particularly attractive from the pleasing manner in which it describes the female sex: neither as goddesses (as they are described in the braminical poems) nor as brutes, which is too often the style of the braminical puranas. It is not only amusing but written with such delicacy that any Hindu female might read it with gratification. The

Vanam, as he names Peter *Rayapa*, from Rayi a stone. He calls James Yagappa, and John Arulappa. For martyrdom he uses *martura*). The betrayal of our Lord to the Jews concludes this book.

The fourth book describes the crucifixion and subsequent events. The author now takes occasion to teach the doctrine of purgatory, for which he uses the Hindu phrase *pitru-locam*. This, and a few other passages, particularly the Salutations to the Virgin at the opening of the poem, shew that the poet was of the Romish faith. Then are described the Saviour's Resurrection and appearance to the Maries. The journey to Emmaus. Then follow brief accounts of the ascension, and the descent of the Holy Spirit. Then the beatification of the Vïrgïn—Peter being left on earth as head of the Church. On the wrath of God and the intercession of the Redeemer. The Last Judgment—Conclusion, containing a summary of the points in the creed, with poetical version of the "ten" commandments. The writer has no where inculcated either the worship of Saints or the other peculiarities of the Church of Rome: at the same time he has courted the attention of Bramins by dwelling as little as possible on the distinguishing doctrines of Christianity.

This poem is written in a beautiful style, and though somewhat too learned for beginners will afford most valuable aid to the advanced student of Telugu poetry, and will spare him the tedium of learning the language through the medium of braminical books. He should *first* read the *third* canto.

tendency of these two books is thus discriminated. The puranam is the Bhacti cānda: or attributes every gift to the force of faith. The Lila is the jnāna cānda, or assigns wisdom to be the means of attaining future happiness.

The Chenna Basava Puran, the Mari Basava Puran, and many more Jangama legends found under various names in Telugu and Canarese (nearly all of which are to be found in the Mackenzie Library) do not merit much notice. They are free from the pride, cruelty and abominations that disgust the English reader in the braminical puranas, but are merely wild vagaries of which more than enough may be seen in the Basava Puran. With slight variations they all run in one strain: that a certain saint out of love to Siva vows to earn money in some particular mode, and he then bestows it on Jangams, and becomes their servant. Accordingly Siva appears to him, and carries him to Cailāsa. On other occasions a "worthy" cuts off his wife's hands or nose because she presumed to touch or smell flowers which he was about to offer to the lingam in adoration: Siva as usual appears, heals her, and carries the pious pair to Cailas. There are miracles in abundance, and some of them very entertaining.

There are other volumes inculcating the yoga system (tatwa bodha) which to our ideas is strange bewildering nonsense. Herein there is but one system, common to all, whether Bramins or their opponents. For this unmeaning mysticism pervades every sect of the Hindus, and is analogous to the Sūfi reveries known among Musulmans,* and to the mysticism promulgated in France and Germany by the followers of Bourignon and Swedenborg. To lose one's senses (*cum ratione insanire*, as Terence says) seems to be its highest aim. Hindus who pretend to learning are fond of dealing in these idle topics, for the purpose of astonishing their hearers, but we shall find that their stock of phrases is soon acquired, and their fund of ideas is yet more slender.

The great theme perpetually reiterated by the Jangams as well as by all the other followers of the reformer SANCAR ACHARI is the resolving our body and mind into spirit. That the *atma* (soul) *is to* BE

* Vide Malcolm's Persia, vol. 2, chap. xxii. and Sir William Jones's Essay on Mystical poetry. See also Extracts by Sir William Jones, from *Baxter* in the Madras Journal, for October 1836, p. 448. In Telugu the favourite work on the Yoga Sastram is the Vāsu Deva Mananam. It does not appear that Basava encouraged such reveries.

This mystic science is indeed an unfathomable profundity of nonsense, such as we may find in the Rabbinical Targum. (Vide Schœttgen and Adam Clarke on 1 Cor. xv. 44). In the Siddheswara Satacam (lately printed in Telugu), and other volumes of devotion, the soul as a female addresses the deity as her lover and husband: as is often the mode of address used among the Persian Sufis (vide Madras Journal, vol. 5, p. 129).

the linga and thus to become one with the deity. This favourite theory is in its ulterior consequences destructive of moral responsibility, for if men become the deity, he of course is sinless, and they are accordingly absolved from sin.

It must be acknowledged that we no where find Basava inculcating this doctrine. It certainly forms the concluding lecture of the Lila: but that is a work not pretending to authority, but recording the opinions received in the national philosophy. This shews what pitiable ignorance Hinduism is in its highest flights. For they all acknowledge the *yoga sāstram* to be the great means of obtaining oneness with God.

It is clear that the Jangams are inconsistent enough in their belief: for while they condemn the Bramins as misrepresenting the truth, they are fond of perusing the various saiva legends wherein of course Siva and Pārvati are the deities, and there is no mention of Basava or his disciples the Jangams.

The most popular of these poems are the Calahasti mahatmyam, or legend concerning the pagoda at Calahasti: the Bhallana Charitra, wherein a king gains a blessing by making a present of his wife to Siva who visits him in the guise of a Jangam! and who thereupon as usual, carries both of them to Cailāsa! the Vira Bhadra Vijayam, the Bhanumad Vijayam, the Madhura Puran also called Halasya Mahātmyam or Socca Natha Lila (a high flying Aradhya work), the Bhanumad Vijayam, and a few more saivite legends.

They sometimes claim the poet Vemana as preaching their creed, but though he evidently held the Bramins in detestation, and shews a partiality to the tenets of Basava, he does not embrace the Vira Saiva tenets. The insulting manner in which he speaks of the female sex furnishes another proof that he could not be a Vīra Saiva. He also speaks of future transmigrations: but the Jangams believe transmigration to have terminated.

But these remarks on their literature cannot be concluded without a few observations on

The Tantras.

Bramins frequently allege that the Jangams are a depraved sect, who are guided by the Tantras or heretical books. But we should not incautiously believe this. The Jangams are in all respects opposed to licentiousness, which is the main spring of the Tantras. The Jangams came from the west. The Tantricas from the north. The Jangams adore the linga and abhor Maia the goddess of Delusion (Venus or Cali, as Devi), who is expressly the goddess (Yoni, or Bhaga Mālini) of

the Tantricas. The Tantricas take no notice of the lingam: they adore Betala (the devil), and other malevolent powers. The Jangams honour Siva as Daxina Murti or the beneficient and loving deity. The Tantricas say they aim at a perfect release from fleshly lusts. The Jangams do the same. But the former, being hypocrites pretend to yield to their passions as the path to freedom. Whereas the Vira Saivas call on their votaries to deny themselves in all respects. They attend especially to the rules concerning funerals, marriage, and placing infants in the creed. On all these points the Tantras are silent. The Tantras inculcate the use of flesh, wine, magic and debauchery, the Jangam creed abhors these. The Jangams are an avowed sect; the Tantricas assume the guise of Smartas. The Jangams train up their children in their creed; the Tantricas (like the Arreoys in older times in Tahiti) merely admit proselytes. The Jangams are sober, devout and humble. The Tantricas are debauched, atheistical and proud. The Jangams are rigid puritans: the Tantricas are licentious atheists. Herein their depravity resembles that of the worshippers of Isis in Rome, the "*Socialists*" of modern days in England, the St. Simonians in France, the *Illuminati*, and other *philosophers* of Germany, the followers of Cagliostro in Italy, and the Nessereahs at Kerrund in Persia.*

With a few touches of his felicitous pencil, Shakspeare has given a view of their system, or *philosophy* which is the Sacti Puja or Worship of Power.

> " Thus every thing includes itself in POWER:
> *Power* into will:—will into Appetite:
> And Appetite, an universal wolf,
> So doubly seconded with Will and Power
> Must make perforce an universal prey,
> And, last, eat up himself."

TROILUS, I. 3.

Again, (Anthony and Cleopatra II. 1.)

> " Let witchcraft join with beauty, lust with both:
> " Tie up the libertine in a field of sweets
> " Keep his brain fuming," &c

Indeed the sottish aspirations of Gonzalo (Tempest, act II, scene 1) give a summary of the bacchanalian rites taught in the Tantras. And if the reader has any curiosity regarding their system of magic, he will find it in Dr. Herklots's English translation of the Canoon-e-Islam or customs of the Moosulmans of India.

* Regarding the Nessereahs, see Buckingham's Travels: cited in New Monthly Magazine, 1829 p. 259.

Knowing the deserved odium that attaches to the Tantras, Bramins assert that these constitute the Jangam system. But were this the case how does it happen that the Tantra volumes are found only in the possession of Bramins? The fact is that both parties read the Tantras from motives of curiosity just as a protestant might read the Koran without in any point adopting the Mahomedan faith. The Jangams honestly avow, and vindicate all they do, they have no motive for concealment. The Bramin acts on an opposite principle and assures us that the Jangams are a depraved and senseless set of hereticks, who obey the levelling principles of the Tantras, and pay honour to the vilest castes. But two widely different principles govern them. The licentious Tantricas reject caste because it is an ordained rule of society: he degrades all men to the brutish level. The Jangam is no leveller: he indeed desires to abolish caste: but by raising from the lowest grade those whose faith shews them to be good men. Indeed the imputations made against them are very similar to the infamous stories circulated among ourselves, in older days against the Puritans, the Quakers and Moravians,* and investigation has shewn them to be equally false.

It is to be observed that no instance is known of a Vira Saiva acting on the principles laid down in the Tantras. To excuse their aptness to read these abominations they allege that the Tantras belong to their creed because they describe Siva as the great deity, and countenance, as Basava does, the abolition of caste. These are but slender apologies, for such an imitation of the evil example set them by Bramins.†

In concluding these remarks on their literature, we may add that the Jangams have no objection to read and study any part of the Bhagavat or other braminical books: only they refuse to accept them as divine and authoritative.

* See Southeys Life of Wesley, vol, 1. p. 359.

† The Minda Jangamas or Bachelors are spoken of in various passages of the Lingadhari poems. They are confessed to be libertines but are devout. They have interviews with (Vesias) courtezans who are likewise devout!!

The following is the received opinion. The Jangams are entirely forbidden to have intercourse with prostitutes: but among the earliest proselytes were some unmarried men, who were permitted by Basava to have intercourse with courtezans who, belonged to the sect. These men were called Minda Jangams or libertines, and in the present age there are none; for all are bound either to marriage or to virtuous celibacy. That Basava permitted this is only a theory, and rests on no proof.

In the western districts there are prostitutes who are called *Basvinis*, and are said to be thus devoted by their parents, on their lives being in danger through illness in infancy. Some of these are, as I am informed, daughters of Jangams: but all are not so: being children of Hindus of other castes. I have heard of some Jangams in similar cases attempting to remove a child's illness by giving it a braminical name, with a view to appease some god or goddess, whose displeasure is imagined to have caused disease.

These statements certainly shew the purity of the creed not to be so complete as its devotees assert.

On their belief regarding the Deity.

In all the various creeds that exist among the Hindus, they profess to adore one only God, and represent him as appearing under various names. Thus in the Vira Saiva creed, they profess a belief in SADA-SIVA alone as the supreme being, who is invisible but pervades all nature. They frequently speak of him as DAXINA MURTI or the express form of goodness, who descended on earth under the name BASAVA and likewise as ALLAMA. The following Sanscrit hymn or prayer to DAXINA MURTI was written by the celebrated divine AGASTYA: it forms part of the *Agastya-ashtacam*, and is prefixed as a motto to the Prabhu Linga Lila:—

1.

Bramh ānandam, parama sukhadam kēvala jnāna mūrtim,
Dwandw ātītam, gagana sadrisam TATWAM ASI *yādi laxyam!*
Ecam, nityam, vimalam, achalam, sarvatas sāxi bhūtam,
Bhāv ātītam, trigunā rahitam, sad GURUM *tam namami!*

2.

Vata vitapi samīpē, bhūmi bhāgē nishan'n am
Sacala muni janānām, jnāna dātaram ārāt,
Tribhuvana Gurum, I's'am, DAXINAMURTI *Dēvam,*
Janana maran'a duhkha xēda daxam namāmi.

1. *I salute the great teacher, the bestower of divine happiness and supreme bliss; the image of perfect wisdom; who is removed from all griefs; who is represented by the sky; who is denoted by the* "TRUTH" *and other names. The one, Eternal, stainless, stable, and Omniscient, the incomprehensible: who knoweth neither Passion, Partiality nor Folly.*

2. *He who sits on earth at the foot of the fig-tree:* who bestows wisdom on all the devout hermits who surround him: Lord and teacher of the universe, the God who is embodied Goodness, him do I salute as the releaser from the bonds of life and death.*

When the deity is spoken of as invisible he is named Siva, Sadā Siva, Paramesa, or The Supreme Being. When described in a visible form the name is Daxina Murti or the image of Grace. When described as on earth, Allama is the usual name: though this is declared to be only another name for Basava.

* The *vatá vrixam*, the banyan, or fig-tree is the Hindu emblem of immortality: they believe that in the end of time all nature will perish except one mystic fig-tree at the foot of which, the deity will be enthroned.

Thus we see that they look upon their leader as a divinity: imitating the Bramins who have exalted their heroes, Krishna, Rama and Hanuman, into gods on earth.

The vague manner in which these names are used produces some inconsistency. Thus Basava *is* actually Siva: vastly superior to the mere Siva or Jupiter who is the spouse of Parvati: and yet is sent on earth by him. He is born as Basava, then appears as Allama, is adored as Daxina Murti: and then we have interviews between these personages, whereat Basava offers adoration to Allama.

It is observable that Basava's wife Gangamba, is never supposed to be a goddess: nor does she receive any homage.

Sancar Achari, the great theologian of the Smartas having declared that ONENESS with the Deity is the great object, the Jangam replies that this union is attainable in this life, and that every true Jangam has attained it. Moreover he asserts that his mortal body is a mere member of the image he wears. For, says he, " what am I in the hands of the God who dwells on my breast? *I am earth, he is spirit! I am but a part of him.* We find similar language among some philosophers of Greece and Rome. Thus Livy (lib. xxi. 5,) says *Vidit énim quod videndum fuit* APPENDICEM *animi esse corpus, nihilque esse in eo magnum.* In fact the Bramin looks upon the body as all in all; the Jangam does not. Yet the regard in which they hold the *yoga sastram,* which wholly depends upon the *bodily* frame, and pretends to spiritualize it, is a manifest inconsistency, and forms an additional proof that all the Hindu systems of devotion in their highest flights betray the weakness and blindness of unassisted human nature.

Though this creed utterly condemns all worship paid to Siva and his spouse Parvati (Jupiter and Juno), still these personages and their attendants (Nandi, Bhringi and others) are familiarly introduced in the Jangam poems. This odd inconsistency is analogous to that we meet with in Addison, Prior, and the French school of English poets: who introduce Jupiter, Venus, Cupid and Mars, as if they really believed the existence of those demi-gods. When questioned on such a half belief in the Hindoo theogony, the reply made by a Jangam is not satisfactory. He does not look upon such poetical machinery as inconsistent with his creed. For, says he, all of these are very possibly gods or powers of various degrees of might, and we are not bound to believe a word of the stories regarding them. We adore " Sadā Siva" (the ever blessed) alone, who is known under the name Basv Esa (the lord Basava) or Allama Prabhu (Lord Allama) who came on earth to found the Vira Saiva faith, or rather to restore it to primitive purity.

Considering that this creed arose in the west of India, in a country bordering on that inhabited by the Syrian Christians, it has sometimes occurred to me that very possibly some of the tales regarding Basava may have been borrowed from legends current among the Syrian churches. Both chronology and geography seem to strengthen this suspicion: and it is worthy of notice that the name Allama, which resembles the Syriac and Arabic name of God is attributed by them to their deity. The word Allama seems to be foreign, and in their eagerness to account for it, the various poets, whether Sanscrit, Telugu or Canarese have adduced roots which will not bear enquiry. Indeed the learned men who assisted me in the present investigation have acknowledged that the etymologies adduced are strained and improbable. They however, would by no means admit my suggestion that this name originated in Allah: and particularly observed that no Jangam had ever been known to embrace Christianity, or the Mahomedan faith.

Yet when we consider how determinately Basava did every thing in his power to oppose the braminical opinions, I confess that his followers thus borrowing a well known name of the deity from a neighbouring country seems not improbable. He ordered *all* children to be introduced into the religion when young. He abolished burning the dead and substituted burial: he set aside the priestly descent, he permitted widows to marry again. In these and many other points equally opposed both to Bramins and to Jainas it appears to me that he attempted to follow the customs of Christians. In particular it is observable that the Jangams reject the observance of new moons and full moons but consider every Tuesday a sacred or blessed day.

If it prove true, as just now mentioned, that there have been no converts from this creed to Christianity, we may fairly attribute it to the neglected state in which the English have left the Jangams. That neglect seems to be the result of the disgusting slanders with which the Jangam character has been blackened by Bramins: who usually are an Englishman's informants on all subjects concerning Hinduism.*

If the Jangams really were the depraved and vile race the Bramins describe them to be, it surely might be expected that they would have become notorious in our courts of justice. But there we do not hear

* As one proof that the Jangams are not more unwilling than other Hindus, to listen to Christian doctrines I may mention a poem written in the Telugu dwipada metre, intended to convey a version of the Gospels. This is the composition of a learned Jangam poet, and having seen but a small part of the work, I can only state that it seems to be well executed in a plain unpretending style. The title is Krista Charitra, and in writing it the author appears to have been guided in his phrases by the Tamil version of the Gospels written by Fabricius.

of them. And surely it is much to their honour that their conduct is not known to be such as makes it a subject for police investigations. Another reason for their never appearing in our courts even as complainants or witnesses is, that we have forced them (until the present day, this necessity being now done away by law) to take the common Hindu oath: which they look upon as a crime. Among themselves the oath commonly used is, to make the requisite assertion while holding the image in the hand. Or else, to lay the hands on the feet of any Jangam. For, say they, every Jangam is a living image of the god we adore.

The Vīra Saivas illustrate their creed by a comparison quite in the Hindu style. They say, the guru is the cow: whose mouth is the Jangam or brother in the faith; and the lingam or image is the udder. The cow benefits its owner by means of the udder: but what fills the udder? the mouth. And what connects the mouth and the udder? the body. Accordingly if a Vīra Saiva wishes the image to benefit him (that is, if he desires to obtain the favour of the deity), he must "feed the mouth"—that this, sustain and comfort his brethren. And then the blessing will be conveyed to him by means of the teacher. Accordingly the Jangams blame the Aradhyas for neglecting this command, and ask how they can expect the image to nourish them if they neglect to sustain brethren and fellows in the faith. For the Aradhya refuses to look upon any but Aradhyas as brethren.

The strangest part of their legends regarding Siva is that wherein he is represented in the most contemptible light as completely the servant of various (bhact) worthies or saints. Such stories abound in the Basava Puran but are excluded from the Lila. In these we are reminded of the Romish legends wherein the Virgin Mary, and some other personages are represented under most degrading circumstances, as obeying or waiting upon the saint whom the legend extols. Thus in the fourth book of the Basava Puran is a story of a certain "worthy" (bhacta) named Nambi, who by force of faith got Siva so completely into his hands that he employed the god as a mere slave. In another story one of the "worthies" scolded Siva who "was so much alarmed that he slunk round the other side of the image, and ran away into the jungle." Other stories represent this paltry demi-god acting either as a thief or as a receiver of stolen goods, to protect his adorers: and they frequently represent him as acting the part of a pander, at the bidding of one of the worthies.

The Vīra Saivas evidently look upon such stories as excellent jokes, and certainly many of the tales are incomparably more amusing as well

as more moral than the dulness of braminical purānās. But when they are asked how they venture to represent their god in this ludicrous manner, they reply at once that this is not their god: their god is ALLAMA BASAVA; the one Sada-Siva (ever blest), whereas the hero of these stories is merely the braminical Siva whom they think as fair a subject for merriment as Jupin or Jupiter is in the French theatre.

In apology for these stories Jangams allege that they all establish the necessity of faith (bhacti) as the great means of attaining happiness and miraculous power. "As the Bramins, say they, call themselves (bhu-sura) gods upon earth we will shew that our *worthies* (bhact) are quite a match for them." Accordingly there are many legends to prove that (Janga-prasadam) food or the *leavings of food* blessed by a *worthy* can perform all sorts of miracles. For instance, a Bramin who by a curse had become a swine ate what a Jangam had spit out and hereby resumed the human form. Elsewhere a Jangam's shoe works miracles.

In all hagiology we find that the fables invented in successive centuries become gradually more marvellous. Accordingly though the legends of the Basava Puran are wild enough they are out heroded by those of later date: for instance, the Chenna Basava Puran, from which (book 2 verse 86) I cite the anecdotes now mentioned.

It must however, be acknowledged that in a redundancy of nonsense as well as in dirt the Bharata beats all the Saivite stories. There we find the very sublime of puerility: braminical legends compared to which *Jack and the Bean Stalk* are nothing at all. And all this is enshrined in a flow of beautiful Sanscrit verse which for richness of expression and harmony rivals Homer himself. The Bramins have had possession of the most perfect and beautiful of languages, and have often perverted its melody and vigour to the vilest of purposes.

Objectionable as many of the Saivite* legends are, they are purity itself when compared to the braminical writings. The great prophet of the Bramins is VYASA, and this venerated Saint's description of his own miraculous birth is a master-piece both of filth and folly.

The Jangams are indeed set free from believing such legends but their own hagiography, though not dirty like that of the Bramins, is full of absurdities: in apology for which they acknowledge that many of these tales bear marks of fiction.

Further, they allege that in all these legends the adorers are not

* I ought to have already mentioned the *Siva Puran*—of which the reader may find an abstract under that title, in *Rees's Cyclopædia* (furnished by Sir CHAS. WILKINS) and he will perceive that this book has nothing to do with the Vira Saiva Creed. This puran is *entirely forgotten.* I possess one copy in Sanscrit and never could discover another.

Vīra Saivas. They are Jainas or else ignorant followers of the braminical follies: but that by the force of (bhacti) faith and charity they ultimately were "admitted into heaven" (literally, borne to Cailasa) which, as they assert denotes admission to the true creed.

In many of the legends we may trace a similarity between the character of Basava and that of Mohammed as described in the various legends current among Musulmans: shewing much simplicity on the part of Basava the master, and a voracious credulity on the part of the disciples. Those Mahomedan stories however, contain many incidents of the most disgusting kind: from which the Jangam books are entirely free.

There is so remarkable an analogy between the Pythagorean *Monad* and the deity of the Jangams that I cannot well avoid adducing the following brief deduction from the philosopher's statements, as represented in Cudworth's Intellectual System, 2d edn. 4to. chap. iv. p. 370, 376.

Pythagoras calls the four principles by numerical names; the Monad, Duad, Triad and Tetrad. The Vīra Saiva calls them by specific names: viz. The Lingam, Bhacta, Guru, and Sivam, *i. e.* the deity, the disciple, the teacher, and supreme spirit: which pervades and unites all three.

The subordinate beings (gods, heroes and demons) of Pythagoras answer to the Vīra Saiva saints: all of whom are supposed to be embodied forms of the prime existence or Lingam; which answers to the Monad: who is also Zeus. The Duad is the passive principle; or *disciple;* he whose mind is the field for impressions. The link between these two is the third principle; the Guru or teacher. In his creative office the deity is mingled with nature by Pythagoras and IS all nature in the creed of the Vīra Saiva.

Love was the first Orphic principle, and so it is throughout the Vīra Saiva creed. Yet it is a created being; for it is a form or appearance of the deity. Thus the Lingam and the Sivam, being the first and fourth principles are one and the same. The Monas and the Tetractys are one.

Again—The Satwa guna being the characteristic of God; the Tamo gunam is that of man; and the Rajo gunam being the connecting link—the supreme state is *Nirgun'a,* or indescribable: which is the fourth or superior deity designated as the incomprehensible and ineffable Tetractys.

Then Monad signifies the prime or independent Lingam, and in its applied form it is *element.* Accordingly *Tejo Lingam* is fire, *ab-Lin-*

gam is water, *príthvi Lingam* is earth; in like manner *pul-Lingam* in grammar is masculine, or the male *element*, and *stri Lingam* is the female *element* or the *feminine gender*.

Some very obscene stories regarding the origin of the Lingam have been printed by various European authors. Those stories *(with which I never met in Hindu authors)* are perhaps braminical; they have nothing to do with the Jangams; in their books there is no mention of the subject; and I have not met with any Jangam acquainted with those fables.

Regarding Allama.

Allama is represented as becoming visible on the wish of Siva—he then descends on earth. There is no tale of his birth, death or final disappearance: and some Vira Saivas evidently believe he is still roaming the earth. In the Lila he appears on one occasion as an Adonis, to enamour Maia. Then disappears and visits a (bhact) worthy in a distant town: again vanishes and visits another: assumes no pomp, has no followers, and manifests no power. Basava is a ruler, a warrior, a king's minister, the head of a family, and fervent in his vows to nourish Jangams (puritans) and to vanquish Jainas. Allama's disposition on the contrary is marked with peace, benignity, humility and gentleness. Precisely in this strain do Mahomedan authors speak of our Lord, and unless he had heard such traditions it appears to me impossible to account for a Hindu poet's framing a character like that of the ALLAMA described in the *Lila*, so remarkably opposed to human nature as seen among Hindus.

Allama is represented as entirely chaste, though perpetually sought in love by Maia and other heroines. He remains unmarried. He has disciples but no relations.

On certain Shrines.

Though the Lingadhāris deny the sanctity of any particular place, the Aradhyas have yielded to the Hindu propensity to worship in certain places as peculiarly holy. Each of these is a temple to Siva and accordingly the priest is a Saiva Bramin. One of these at Canchi (Conjeveram), one at Jambukeswarm (near Trichinopoly), one at Arunagiri (Tirunamala), one at Calahasti (near Nellore), and one at Chidambaram. These are respectively called the lingams (bhūtams) or elements of earth, water, fire, air and ether. These are holy places frequented by Saivas; and the Aradhyas assert that to visit them is meritorious though the priests are Siva Bramins.

Regarding these temples the Jangams profess to have no opinion. They neither approve nor condemn him who worships there: for the sanctity of these shrines rests on the braminical purans.

They themselves profess to hold in honour five other lingams. 1. That of Chenna Mallikeswar at Srī Sailam. 2. That of Cudali Sangameswara, so named from the village where Basava died, or, as they say, vanished. 3. That of Gocarneswar, at a village of that name. 4. That of Bhīmeswar at Draxaram, in the Rajahmundry district. 5. One which is described in Professor Wilson's Essay and said to be at Benares but of this the accounts differ.

In these five places the priests are Jangams: not Aradhyas. At Srī Sailam Jangams pay nothing, though a fee of five rupees is exacted from every worshipper in the other castes (including Aradhyas). It would seem that this was originally a braminical shrine, for there is an image of Pārvati. This goddess, however, sits opposite to the image of Siva: and a Smārta Bramin is her priest while a Jangam is priest to the god. So heartily do these sects detest one another that the (tīrtham) holy water offered to one image is not touched by those who come to adore the other.

The Jangams acknowledge that they have no business to celebrate such worship, and in excuse say that these are customs derived from Bramins.

The odd conjunction of rival gods under the same roof, or at least within the same temple wall, is exemplified at the well known pagoda at Tiruvattoor, close to the town of Madras: where Siva is adored under the name *Adi-Pur-iswara,* "thus called (to use Homeric phrase) among gods: but known among men as"—Teagarāya Swāmi. One corner of his pagoda has been taken possession of by a Sacti or *plebeian goddess,* called Tripura Sundari (Venus): but vulgarly *Vattapu-nanchāru.* The god has a Siva Bramin as his priest, and has his spouse Parvati with him. But the Sacti or paria goddess (who is a much dreaded fiend) has for priest an *ōchē*-man: this is the Tamil name of a low caste, called *panasa* in Telugu, who are tumblers and wrestlers: and are employed to blow the trumpets at funerals. So degraded are they that no Sūdra will eat with them. The sacrifices he offers are buffaloes, goats and the like. This lady's feast lasts ten days, during which the luckless Siva and his spouse receive no worship. The doors are shut upon him and he is left alone till the feast terminates.

All Hindus, even those of the most respectable classes in the town of Madras flock to this pagoda, to gain the favour of these wretched

idols: and there are miracles (well attested) in abundance to prove the benevolence and power of these divinities. The latest I have heard of is regarding a "worthy" who cut out his tongue as an offering to Siva, and the god restored it to him. This god's name, Teagaraya has become a proper name, given to many Hindu boys.

We are not to suppose that the Vīra Saivas approve of such brutal follies. They equally despise both the Siva and the Sacti, and much blame those of the Jangams who timidly follow the fashion in offering homage to this miserable Siva.

On Funerals, &c.

Some particulars regarding funerals have already been given. A few remain to be added.

The Aradhyas, as far as possible, adhere to the braminical customs: though they are obliged to use burial and not burning.

Over the grave the Jangams place an image of the lingam, to which they offer worship for ten days. They then remove it or leave it established, at pleasure.

On the eleventh day they give a dinner to the assembled friends, on whom they bestow new clothes, according to their means.

The Aradhyas believe that the father, grandfather and great grandfather of the deceased, who are in Cailasa *(heaven)*, enter purgatory (the *pitru locam*) at the time of his death: where they wear the appearance of his dead body. To these progenitors are performed the rites, called *ec-oddishtam, nava srāddham, shodasam saptacam,* and many more. Some few use the rite of releasing a bull on this occasion, as other Bramins do.

Under the name of these progenitors the Aradhya guests are fed.

On the conclusion of these rites they say that the deceased is now gone to Cailasa.

But Jangams act in another manner, rejecting all notice of the three progenitors: for whose names they substitute the names Siva, Mahesa, and Sada Siva; which in fact are three names for God.

As a reason for this they allege that they consider the Guru to be the only parent of each disciple. For he bestows the image on them, and they are "*born in his hand.*" For, say they, being born into the faith is a more important event than that of merely being born on earth: and hence they pay reverence rather to the Guru than to the parent.

The image worn by the deceased is placed in his or her hand, and laid on the breast. They attribute to it the same potency that the

Greek Church attributes to the letter written by the bishop, and placed in the coffin.

They are free from the Hindu rules regarding the anniversary of a death. Some few, however, imitate Bramins in solemnizing that day.

Not having myself seen any of their tombs, I avail myself of the following note given me by Lieutenant Newbold: "The tombs of Lingavants of rank are generally massive quadrangular structures, raised on terraces built of stone, and simply but handsomely carved. The interior consists generally of a square chamber beneath which is a vault containing the real tomb: which is also usually square. Over the head of the corpse is sometimes placed a phallus; often ornamented daily with sweet flowers. These tombs are sometimes constructed by Jangams for themselves; and an old priest living in a *mutth* among the rocks and ruins of Bijanugger, led me down into a subterraneous vault, dimly illumed by a solitary lamp: and this he showed me as the destined receptacle of his more mortal part. The bottom of it was strewed with ashes."

Ideas regarding a future state.

A modern writer describing the opinion of the Jews at the present day, on the subject of a future state, says "they believe that they suffer for themselves: Moses is their prophet but they look to their own good conduct as furnishing grounds for hoping a reward. If good, say they, "my God will reward me, and if bad he will punish me."

Such is the belief among the Jangams: who entirely differ from other Hindus with regard to a future state. They make a singular distinction regarding themselves. Other men, say they, are liable to transmigration, but we are not. All who are introduced into the faith are exempt from transmigration. They depart either to heaven or hell, and that state is eternal.

The Hindus in general are credulous enough as to ghosts, sprites, and local demons. But they do not believe in the existence of the Devil or Satan as a separate being. In this the Vira Saivas resemble their countrymen. What we call the work or instigation of the devil, the Hindus call, the fruits of a former birth. In the Christian poem "Vedanta Rasayan" the Devil is called *pisachi;* the same phrase (fiend) is used in our English poet Chaucer.

The description of the *creation* of the world, forming a prominent part of the braminical system they have in opposition devised another mode, described in the Lila. Regarding the end of the world, they have no definite ideas.

On the Prayers used.

The prayers of the Jangams are addressed to the image they wear: which they salute as Basavesa.

The mantrās or prayers are borrowed from the Vedas: but they do not practise the (anushtha'nam) "mode" practised by Bramins.

The daily prayers usually are in the mother tongue. Occasionally they use a Sanscrit canticle: as the following, borrowed from Sancar Achari :—

Anāyāsēna maranam; vinā dainyēna jīvanam;
Dēhāntē mama sāyujyam curushwā Paramēswara!

"O supreme Lord, grant me an easy death, a life free from poverty, and eternal happiness* when I leave the body!"

Or they offer hymns of praise as the following, which is written in the common metre called *Malini.* The metre is broken in the fourth line; and though it might easily be rectified, they leave it as it is, the words being sacred :—

Nayana camala madhyé, jyōti rūpa pracāsam,
Pran'ava maya sabindum, prān'a-linga swarūpam!
Vihata janana pās'am, vighna vich-ch-hēda hētum
Hara hara Guru sāntam OM namas Siva'ya Lingam!

"Blessed image I meditate on Thee who dwellest between my eyes,
"in glorious form! who art the word and the sign,† the supreme being!
"Free me from the ties of the flesh thou who loosest every bond!
"O Teacher thrice blessed!"

Among Bramins the great mantra is the Gāyatri. This is used by the Arādhyas but the Jangams reject it, and use the *Panch-āxari,* or five-syllabled spell:—adding the shad-axari; or spell of six syllables; i. e. the Panch-axari with the addition of the word OM.

A celebrated verse says:
Vēda mātācha Gāyatri, mantra mātrā shad axari.

Accordingly in rejecting the Gāyatri they reject the Vedas, the Panch-axari or five syllabled spell, is "*Namasivāya*" or glory be to God. If the syllable om (like Amen) be prefixed "om Nama Sivaya," then it is called shad-axari or six syllabled.

* Literally *Identification.* The Saiva creed describes eternal happiness as consisting in four (padavi) *points:* denominated 1, *sálōkiam,* 2, *sámípiam,* 3, *sárūpiam,* and 4, *sáyujiam.* That is, 1 dwelling in heaven, 2 in the very presence of God, 3 bearing his image, and 4 becoming *one* with him.

† Here, as in a former verse, the Sanscrit scholar will not exact a more rigid translation: as that would require explanatory notes, and render the subject more tedious.

After thus addressing the image (in which rite they use the *rudraxa* or rosary) they make such requests as circumstances call for. Social prayer is rarely used. Man and wife, though praying at the same time, address their prayer to the image each person separately wears.

The *prayaschitta canda* or *system of penance* is the most irksome burden imposed by braminical superstition and priest-craft. The smallest mistake or omission in performing ordained ceremonies, is herein considered as a sin, and atoned for by a vexatious system of fasting and unmeaning prayer. The Jangams are set free from this rigid and hypocritical system, but the Aradhyas have not had the courage to obey Basava, who laid it aside. They are nearly as much burdened with it as are other Bramins.

On Rejection of Braminical Ordinances.

One important rule which Jangams observe forbids the use of the special braminical rules. It runs as follows, in Sanscrit verse:—

Apasavyam, tilān darbhan n agnau carnám cha pārvanám
Vikiran arghya pādyam cha saivas sapta vivarjayēt.

"*Let the Saiva (which they declare to signify the Vīra saiva) desist from the rites called* 1 Apasavyam, 2 tillatarpanam, 3 sacred grass, 4 the burnt sacrifice, 5 the stated observances called parvam, at the new and full moon, 6 the arghya, and 7 the pādya."

This verse is intended to sum up all the braminical rites which the Vira Saivas renounce.

It is observable that the burning of frankincense is used among them, but this they say is no breach of the fourth rule.

The Arādhyās do not deny the authority of this text: but they remonstrate that were they to obey it they should be excluded from the braminical order. Accordingly they admit the rule, but agree to disobey every one of its demands.

The Aradhya is charged by the Jangam with gross inconsistence in using the prayers to the sun, which consecrate the braminical thread; and also the *panch-axari* spell which consecrates the lingam.

The Aradhyas cannot venture to take the last step by performing the rite called *shad-axari*, for that implies becoming a *Sannyāsi* or recluse, shaving off the braminical lock, and assuming the tinted dress. These would at once place them in the *Jangam* class: and few Aradhyas have the resolution thus to renounce the law of caste. Accordingly the Jangams abhor them, and to use their own words "hold it sin even to look upon an Aradhya." Thus we see there is bigotry enough on both sides.

Miscellaneous Particulars.

In speaking of their literature the following distinctions are necessary.

They discriminate three paths or opinions: viz. the Carma-canda, the Jnāna-canda, and the Bhacti-canda.

The Carma-canda, or Law of Works, attributes every good and evil act to ourselves. Accordingly men are to be rewarded or punished according as their lives are virtuous or the contrary.

The Jnana-canda, or Law of Wisdom, opposes this; stating that men are the mere instruments of good or evil in the hands of God.

The Bhacti-canda, or Law of Faith, calls upon men to adhere to virtue or benevolence as being the *fruits* of faith:—but adds that the deity is all in all, and our good deeds have nothing to do with salvation.

The *theory* of this creed may be traced to the Mi'ma'msa philosophy; which is thus defined in Wilson's Sanscrit Lexicon. The first part, the *púrva Mímámsa*, or Mímamsa simply, illustrates the *Karma Kánda* of the Vedas; or the practical part (the ritual) of religion and devotion, including also moral and legal obligations. The second part, or *Uttara Mímámsa*, ascribed to Vyása, is the same as the Vedanta, founded on the Jnána-canda or theological portion of the Vedas, and treating of the spiritual worship of the Supreme Being or soul of the universe.

We must however observe that the Lila is often called "*Shanmatasammatam*," that is tolerant or universal, because free from the intolerance which we often meet in other treatises.

While compiling these notes it has been pointed out to me that few of the English are able to obtain the Vira Saiva treatises. This is true, and the manuscripts which we may succeed in obtaining, too often prove incomplete or erroneous. I shall therefore be willing to supply copies to any who may require these works: and the cost of transcription will be found moderate.*

Likewise copies of the Vedanta Rasayanam, a poem the beauty of which is greatly disparaged by the poet's earnest endeavours to prove that the Christian religion is very analogous to what he considers pure Braminism. He goes so far as to designate Christians *Dwija* and *Bhusura* which are mere poetical titles for Bramins as "gods on

* The Lila contains 6900 dwipada lines, the Puran and the Charitra are each of them about twice that length.

earth." He seems to think it an easy thing to reconcile two creeds which are as distinct as light and darkness.

The image is usually placed on the infant's neck on the eleventh day after birth. In the books are fables about their bestowing it much sooner.

For putting this sign on an infant they give this reason. They look upon the child as a heathen until this rite is performed: and it is unlawful to have under their roof a heathen who does not worship their god, and whose eye would contaminate their food.

A life of celibacy is held in small repute: but some, both men and women, embrace it. The rite of marriage among them costs very little indeed. In these points they more resemble the customs of Christians than those of Hindus or Musulmans.

They are as fond as are all Hindus of making vows: often empty and iniquitous enough: but if we may judge from the legends in their books, their vows are chiefly made with a view to obtaining future happiness by the means of charity shewn towards brothers in the creed. Though Aradhyas bestow initiation on women only at the time of marriage, these two rites have no connection, and it is of no consequence whether one or the other is first administered.

The Jangams state that in the present age they very rarely make proselytes: and the reason is that in latter days the teachers insist on ten or twelve years of probation, and this wearies out the zeal of the aspirant.

Looking upon themselves alone as being in the true faith, the Jangams consider the *purva-Saivas* (Smartas) to be in an imperfect state. To use the Jangam's own expression, *their* creed is the flower, ours is the fruit.

The Smartas never make the smallest mention of Basava: they honour *Nandikeswara* which the Jangams say is only another name for Basava.

The difference between *Samanyas* and *Visēsha* Jangams has been pointed out. But it is not easy to understand in what respects the confirmed class is superior. They acknowledge that both classes have an equally strong hope of future happiness.

All the sects who look upon Siva as their god *profess* to imitate his garb (that of a *sannyasi* or monk) by smearing ashes over their foreheads and bodies, so as to dress as penitents. A few Aradhyas attempt to wear this garb, which if worn as described in the Mari Basava Puran would be ridiculous enough. But in general the dress of Lingavants differs from that of other Hindus only in the rite of wearing the image.

The sect occasionally style themselves as *Māhēswars, bhactas, Ganas* or use the names of some other attendants on Siva. But these respectful titles are not conceded to them by others, and Bramins generally look upon them as *Pasandas* or hereticks.

The *Linga Baljas,* a class of Hindus who abound in the Cuddapah and Bellary districts are apparently the same tribe, who have been already described as *Cannadilu* or Visesha Jangams.

Notwithstanding their rejection of feasts and fasts, the Aradhyas are as strict as other Hindus in celebrating the Sivaratri feast. And the Jangams though they profess to condemn such superstition usually follow their example in this respect.

The *mantram* which I have described as breathed in the ear, is whispered in like manner in other sects:—of which a proof may be seen in the present Journal, vol. iii. p. 21.

The various *mudras* or attitudes used in prayer by Bramins, are observed by Aradhyas, as strictly as by Saivas. But the Jangam renounces them.

At the present day we rarely meet with Jangams of tolerable education even in their own language. Their religious prejudice have excluded them from most of those schools, wherein either Christians or Bramins are the masters: and I have heard of only one school at Madras, wherein a Jangam (under Christian directions) is the teacher. In many instances the Jangams are too poor to pay even the smallest stipend for education, however earnest they may be in a desire for instruction.

The Vīra Saivas resemble the old puritans in combining the devout and the warlike character. In their zeal against their religious foes the Jainas, they certainly were very intolerant. In modern days the insurrection at Kittoor and that at Mangalore have shewn how turbulent they can sometimes be. The king of Coorg, now a state prisoner, is a Jangam. The Raja of Punganoor near Chittoor is of the same creed.*

These Hindu barons are of the class already described as *Visesha Bhact,* which is free from any peculiarity in dress, and not having taken the higher vow, men of this class may not inconsistently be soldiers. The Mysore raja is often mentioned as being a *Sāmānya Bhact,* but it would appear that though attached to worshippers of Basava he is not himself a Lingadhari.

* The reader is requested to correct a few errata in these pages. In p. 144, line 12, for *found* read *founded.* In p. 158 substitute the *Rucmangada Charitra* for the Bhanumad Vijayam where that name is accidentally repeated in line 24.

Conclusion.

The statements now made may be summed up in a few lines. The Jangams are a sect of Hindus who have lasted about seven hundred years. They adore Siva as the one God, and wear his image hung on their breasts. They call themselves primitive worshippers, and look upon others as idolaters. They say that they reverence the Vedas, the Bhagavad Gīta, and the doctrines of Sancar Achari, the great reformer of the Saiva creed who in point of time preceded their teacher Basava. But rejecting the Bhārata, the Bhāgavat, and the Rāmāyan they deny the authority of Bramins: by whom they therefore are detested as hereticks. They are the disciples of Basava, and as all Hindus are apt to exalt their teachers into gods, they declare Basava to be the god Siva himself. Basava though born a Bramin's son abolished every one of the braminical observances; particularly caste, pilgrimage, and penance. Some Bramins joined his creed, being in all probability his personal friends; he persuaded them to lay aside their name, and call themselves *Arādhyas*, or *Reverend* (*καλοι*, whence Caloyer the modern Greek name for a priest). But he could not induce them to lay aside the braminical thread: the rite of assuming which requires prayer addressed to the sun, as a god. Hence the Jangams assert that these, like other Bramins are idolaters: and accordingly the Arādhyas are rejected by them and treated with scorn.

They are a peaceable race of Hindu puritans: though at times they have been more warlike: and when their tenets became correctly known to the English there will appear no reason for excluding them from that patronage which has hitherto been extended only to Bramins, or those Hindus who reverence Bramins. Various prejudices have hitherto existed against the Jangams: these have now been investigated, and the result unreservedly communicated to the reader; who will find that the Jangam literature, however abhorred by Bramins furnishes an agreeable introduction to the various languages of Southern India.

Postscript.

The able reports printed in the Madras Journal have shewn the literary value of the Mackenzie manuscripts. But it is much to be regretted that a large collection now lying untouched in the India House is not transmitted to Madras, where the books might prove very useful. I allude to about *eighteen hundred* volumes of manuscripts,

chiefly written on palm-leaves, in the Telugu, Canarese or Tamil character. Being in London in the year 1837, I obtained the permission of the then Librarian Sir Charles Wilkins, to examine and catalogue this collection. And I found therein 468 volumes in the Tamil character, 997 in the Canarese and 336 in the Telugu—not to mention about 250 which being in the Devanagari, Nandi-nagari, Bengali, or Orissa writing may be available to learned men at home. Were the manuscripts in the Telugu, Tamil and Canarese character transmitted to Madras, and placed under the care of the Literary Society at the College, they might afford us aid in many enquiries. Whereas in Leadenhall street they are buried in obscurity. I heard of these books only in the course of conversation when they were mentioned as being written in nobody knew what language, and as forming part of the spoils of Seringapatam, or else as collected by the celebrated *Leyden.*

The examination I made was very kindly brought to the notice of the Court, by Professor Wilson, who now succeeded to the Office of Librarian. I was honoured with a letter of thanks, but would venture to suggest an application in the name of the Literary Society requesting that the Honourable Court would direct the transmission of these books to Madras; where, if no one else was inclined to undertake the task, I (if then present at Madras) would cheerfully engage to arrange them so as to be available for literary purposes, separating from the mass those volumes which are of no value, and selecting those which merit attention. I have lately ventured to apply to the learned librarian for the use of some manuscripts, which I at present require, but think that many will join me in expressing a regret that a collection so valuable should lie useless; surely the Honourable Court in transmitting these books to Madras, would retain the proprietary right while they rendered the collection available to the learned at large.

The rough draft of the catalogues, I prepared, is now left on the library table at the rooms of the Literary Society: and I think will suffice to shew the value of a collection which in its present state is lying entirely unavailable.

IX.—*On the Cultivation of Cotton in Inaia.—By* J. M. Heath, *Esq.*

In the year 1818, the attention of the Madras Government was directed to the subject of the introduction of improved descriptions of agricultural produce into India. At that time I held the situation of Commercial Resident of Salem and Coimbatore, and instructions were sent to me by the Board of Trade, to attempt to introduce the cultivation of Bourbon cotton into those districts.

Being entirely unacquainted with the subject myself, I requested my friend Mr. J. M. Strachan, of the house of Arbuthnot and Co., to procure information for me upon the subject, from Mr. G. A. Hughes, of Tinnevelly, whom I knew to have been long engaged in the cultivation of Bourbon cotton.

In consequence of this application, I received the accompanying paper, drawn up by Mr. Hughes, and I have great pleasure in laying it before the Committee, as it appears to me to contain more information upon the cultivation of this valuable plant, than I have ever met with elsewhere.

In my endeavours to introduce the cultivation of Bourbon cotton into a part of the country where it had never before been tried, I had to encounter the usual difficulties which attend on the introduction of any novelty in agriculture: but these difficulties gave way to perseverance, and at the end of four years, I had the satisfaction to see the experiment completely successful. In the season 1823-4, I procured from the district of Coimbatore, 500 bales of clean Bourbon cotton, of 300 lbs. each, and the natives were by that time so well satisfied that the cultivation of this article was more profitable to them than that of the indigenous species, that, I believe, had encouragement to the cultivation been continued, it would, by this time, have completely superseded that species of indigenous cotton which is cultivated in the light and gravelly soil so abundant in the South of India.

In the Madras territories, two varieties of the cotton plant are cultivated, and they require very different soils: one is an annual plant, called in Tamul, *Oopum Parutti ;* the other is a perennial plant called *Nadum Parutti:* the first comes to perfection only in the black adhesive soil, known by the name of cotton ground, and which appears to be formed from the decomposition of trap rocks: the other plant requires a very light loose soil, such as is formed from the disintegration of granitic rocks, and the soil appears more favourable for

its growth when mixed with the calcareous tufa, known in India by the name of *Kankar*.

It was in soil of this kind, which occurs abundantly in Coimbatore, that my experiments were made: I made an abridgment of Mr. Hughes's paper, and had it translated into Tamul; a copy of this was given to each farmer who agreed to make trial of the seed, and I had a person whose duty it was to go round and inspect the progress of the cultivation, and to make monthly reports to me upon it; at the proper season for pruning the plants, I went myself and showed how the operation should be performed, and I believe that the success of the experiment was, in a great measure, owing to this step. I have never observed that the process of pruning has been adopted by the natives in any branch of their husbandry; and I believe it is quite indispensable for the successful cultivation of the Bourbon cotton.

In the districts on the Coromandel coast, south of Madras, the light soil above described is more abundant than any other; and there is no doubt that the Bourbon cotton plant might be successfully cultivated wherever it occurs: the only point on which my experience differs from that of Mr. Hughes is, as to the influence of vicinity to the sea, upon the cultivation of this plant. He seems to think that situations near the sea are necessary to bring the plant to perfection; my experience goes to show that it will come to perfection at 150 miles from the sea.

At the time I commenced my experiments, the price of cotton (Oopum), was about 3*d.* per pound in the district; this was a high price comparatively, and had been caused by the unprecedented demand for cotton in 1818: the usual prices had ranged from 2*d.* to 2½*d.* To induce the farmers to make trial of the Bourbon seed, I offered them a price for their uncleaned cotton, which would have made the cost of clean cotton about 4½*d.* per pound; the value of the Bourbon cotton in the English market was fully 50 per cent. more than that of the country cotton; and in some instances where proper attention was given to the cleaning, the value of the Bourbon was more than double that of the country cotton.

Before I quitted India, in the year 1825, the situation of Commercial Resident of Salem and Coimbatore was abolished, and the Company discontinued their encouragement of the cultivation of Bourbon cotton in that quarter. The natives not requiring so fine a material for their own use, and not finding a market for it, on the part of European merchants, discontinued the cultivation: and a great proportion of the land which I left under cultivation with Bourbon cotton, was cleared to make room

for grain, or some produce which was more certain of a ready market. The subject was subsequently taken up by a gentleman who had the charge of my private concerns in India during my absence in England, and the provision of Bourbon cotton is, I believe, still continued by him, although I have no means at present of saying to what extent.

Paper by G. A. Hughes, Esq., *enclosed in the preceding.*

The plant is of so hardy a description that it may be safely believed it will grow well in any situation, yet to have it sufficiently productive, much attention must be given to soil as well as to culture. With this view, all very rich, heavy, retentive stiff soils, should never be selected; for although they produce luxuriant plants, yet they have much and more tendency to produce redundancy of wood and leaf than of produce, and almost always to the generating of insects. The red and brown loams, or, indeed, any silicious or calcareous soil, fertile in a moderate degree, are, upon the whole, in my idea, the most suitable and the most fruitful. What is commonly known to us under the denomination of cotton soil, the deep black vegetable loam, is, I think, to be entirely avoided. The Bourbon species has almost in all respects, a character different from the indigenous, and as far as my observation goes, demands a mode of treatment similar to that of America. In the point of climate, the vicinity of the sea, or situations to which the influence of the sea air extends, are, on every account, I believe, to be preferred. The vicinity of the Ghauts, or any situation near high mountains, on our Peninsula, should not possibly be chosen, because the climate near them is certainly likely to be less uniform in the hot months than this shrub requires; a dry soil and a dry atmosphere from March to May, and from July to September, seem almost essential to the good quality of the wool as well as to its productiveness.

Before touching upon the operation of pruning, which I practice twice in the year, and not once only, it might be as well to say something on the culture. I am now entirely convinced the plant will last a great number of years, and will not at all fall off if well and properly managed. The objection to this in other countries is said to be that it produces swarms of insects, but this, I suspect, is the defect of treatment and of soil, rather than the age of the plant, since the youngest plantations are equally liable to this evil. Under the persuasion that it may be preserved with advantage many years, a systematic and careful culture from the very first must be the best. The seeds should be sown, or the young plants be set in straight rows, eight feet apart, and the rows also regularly eight feet asunder. Plac-

ing the little mounds of plants (containing two, or at most three each), at regular squares, in this mode, is of much advantage throughout. The facility for ploughing and hoeing is greater in this than in the common methods. The free admission of sun, the freest circulation of air and light winds, are of the greatest benefit to a perfect culture. This may be mentioned, because I know that too close a cultivation is a common mistake. By the last mode, the plantation may become a close low thicket so much infested by rats and snakes, as almost to be a work of danger to enter it. If the seed can luckily be got into the ground in September, the young plant may be sufficiently strong to resist the pernicious and continued wet of a heavy monsoon. Little is gained by sowing seed in October, November, and December, unless the land is very high, of a dry description, and clean from weeds, which, at this period, generally smother all other vegetation near them. The clear intervals of these months answer well of course for transplanting, and the first week of January, in general, very well also, both for sowing and transplanting. It is well, however, to have the plants well established in the soil some days before the heavy rains, and with this object, I have lately succeeded wherever it was desirable, in transplanting the young plants on the very first rain, and this year early in October. They bear it extremely well in cloudy and light rainy days, and it will succeed without doubt, immediately, if they have a small portion of earth attached to them. Whenever this mode is proposed, a seed bed must be prepared and sown in July, in soil tolerably good, and watered from some well near the place that is to receive the plants in October.

Of late I have given the plantations under my own immediate eye their principal pruning, as soon as ever the heavy rains have passed away, say from the 15th to the 31st December, or just at the time before the sap becomes active. In the fine days of January, I plough the plantation thoroughly three or four times over. In less than two months the whole is again in the finest foliage and in full blossom, and continues in full bearing all the months of March, April, and May. Just at this time, at the crisis of extreme heats, a short suspension may be observed to the production of fruit-buds. I should mention that, at the pruning above adverted to, I clear the plants entirely of all the very young wood, or all with soft green bark, cutting the shrub down generally to two feet high and two feet wide, but leaving all that can be properly left of the firm wood with the strong white and brown bark. In June again there will generally be a good portion of pods still remaining on the plant, and the rain here is at that season very light; and

I find it enough to cut away merely the long straggling twisted soft shoots with diminutive pods; and if this is done very early in June, the better. But under all circumstances, the plant would yield a good produce from July to September, unless it should receive any damage from rain in those months. In June, perhaps, if the soil allows, it is enough to give the plantations a slight hoeing with the mamootis. In the old plantations, nothing seems necessary to be attended to in the monsoon, but draining them of the rain as much as may be practicable.

I know not well how to answer the query regarding the annual produce on any given quantity of land—at least with the precision and satisfaction I would wish to do. It is a very speculative point, and admits of wide limits of estimation. We may learn from books, that from 200 to 300 pounds of clean cotton are produced, and are expected, per acre in the West Indies and in America. Here some of my dependants, to whom I have alloted small spots of land to grow it for me in their way, think they perform wonders if they give me as much as fifty the acre. This is obviously a matter mostly resolving itself into the degree of judgment or diligence exercised in the cultivation, and no less so perhaps in the suitableness of soil and situation. Speaking for myself, I shall be very well content indeed to be sure of getting one hundred pounds the acre of fine clean cotton; and yet, adverting to the very prolific nature of this species of cotton shrub, I can give no good reasons why much more might not be expected. On this point, important as it must be admitted to be, and on all considerations of expense, as compared to the produce from any given measurement of land, I must confess that with all my experience I yet feel an incompetency to impart anything like precise and definite information. I cannot calculate my cotton to cost me less in this country than twelve-pence the pound. The freight is of course paid in England. But it is very obvious that if it were within the possible labours of any individual to produce anything in quantity that was material, the benefit would be abundantly handsome; but the difficulties to carrying it on on a large scale, cannot be known to those who have not engaged actively in the undertaking. The natives can in nothing be trusted, as I have found to my serious loss. But I will pass from these considerations to what is of much more importance.

The extract of a letter I lately received from my London agents, and which I annex, may prove of great utility in pressing upon the attention of your friend, the vast importance which is attached to the process of cleaning. I have known, to my cost, how easily these things may be overlooked: care to this department of the business must

commence from the very gathering of the pods. The cotton should never be picked but at the most mature state; and even then, although gathered in the very hottest weather, the seed contains so much moisture that it is well to have it carefully dried immediately afterwards, two or three days, and before it is set aside; and care too should be taken that it does not at this time contract dirt and sand in the wool. Before I send it to the mill, it is now my practice to have the pods of cotton, as it is attached to the seed, most carefully examined in the first instance, and all the decayed, damaged, discoloured, immature part of it, first separated; at this stage, probably, not less than one-tenth of the whole is rejected in this way—and it is well rejected; it is then put to the mill after a little exposure to the sun in the usual way everywhere. But at the same time that the wool is separated from the seed, I have other women always present to clean it again by hand, as soon as it comes from the mill; all remaining impurities are better detected at this time than if the wool were previously pressed together again. The wool in this way is merely, I may say, *searched*, not pulled or broken. Even in this process there is a loss of scarcely less than five per cent. It is a good day's work for one woman to clean by the mill 9⅜ pounds of paruttis, or the cotton with the seeds; the wool which is separated is quite as much as another will manage, giving a produce of 2¼ pounds on a large average of very fine and extremely clean cotton, which is immediately placed in strong Dungaree bags, until I have enough for a bale.

Extract of a Letter from Messrs. Fairlie, Bonham, and Co., London, 22d April, 1817, *to George Arthur Hughes, of Tennevelle.*

"We enclose the Price-Current of cotton-wool at the present sale at the India House, amongst which it gives us much pleasure to point out your five bales by the *Grant*, which sold from 2*s.* 1⅜*d.* to 2*s.* 1⅞*d.* per pound.

"The great improvement which this parcel shows to be attainable in the cultivation of the Bourbon species with you, is indeed very encouraging, and seems to open a fair field to future operations on a more extended scale; you have hitherto succeeded in this instance only, in producing a real equivalent for the Bourbon wool, what we formerly had, being but a distant imitation, and in request only when the true Bourbon was particularly scarce and dear. For it is not the fineness, nor the cleanness of the staple, important as these qualities must always be, that will suffice to raise it to its proper estimation. Evenness of

fibre, and susceptibility of being drawn out into a thread, without the fibre being entangled, are also indispensable, and may be greatly marred by the process of beating with sticks, so as to occasion that entanglement. Managed as the present consignment has been, so much superior to the preceding fifteen bales, any quantity would here meet a ready sale, and we should suppose would amply recompence the trouble and care which it demands.

"We think this is a matter of so much importance, that we have taken a sample from these bags, which we intend to accompany this letter, that, by reference to it, you may keep in view the qualities that would always command this market."—*Journal of the Royal Asiatic Society*, vol. 5, p. 372-8.

ART. X.—*On Indian Iron and Steel; in a Letter addressed to the Secretary to the Royal Asiatic Society of Great Britain and Ireland.* —*By* J. M. HEATH, ESQ.

IN the month of Jnne, 1837, the Managing Directors of the Indian Iron and Steel Company received a letter from Robert Clerk, Esq., Secretary to the Madras Governor, forwarding a copy of your letter of the 17th of February, 1837, addressed to the Governor of Madras, requesting information on the subject of wootz*, or Indian steel: the purport of Mr. Clerk's letter was to ask us to furnish the information and specimens required by you, provided we could do so without inconvenience or detriment to our own interests.

At the time Mr. Clerk's letter was received, I was the only one of the Managing Directors who was in possession of sufficiently detailed information on the subject of the manufacture of Indian steel, to be able to reply to the queries contained in your letter, but as the duties I had to discharge at that time in the superintendence of our iron works at Porto Novo, were exceedingly laborious, it was altogether out of my power to turn my attention to the subject previously to my departure from India, in November, 1837 : the leisure afforded by the voyage home has enabled me to resume the subject of

* Wootz, or Oots, is probably the name of steel in the Guzerattee language in use at Bombay, from which place the first specimens of Indian steel were sent to England under that name.

your letter, and I have now the pleasure to communicate to you such information on the subject of Indian steel, as my experience has enabled me to collect.

The ore from which the wootz steel is made, is the magnetic oxide of iron, combined with quartz, of which specimens accompany this letter: the ore varies much in its appearance, according as the grains of quartz and oxide of iron are large or small, but the proportion in which the component parts unite, is nearly uniformly 48 of quartz and 52 of oxide of iron, in 100 parts by weight.

It is found in many parts of the South of India, but the district of Salem is the principal seat of the steel manufacture. The ore occurs generally in the form of low hills, and the quantity of it which is exposed above the surface of the surrounding country, is so considerable, that it is not probable that it will ever become necessary to have recourse to under-ground operations, supposing the smelting of iron ore from this district to be carried on to any extent that can be contemplated.

It is prepared for being smelted by stamping and separating the quartz from it, either by washing it in a current of water, or by winnowing it in the manner in which rice is separated from the husk: in most of the deposits of ore, parts are found in which the quartz is in a state of disintegration, and these, from the greater facility with which they are broken, are always selected by the natives for their furnaces.

The furnace, or bloomery, in which the ore is smelted, is from three to five feet high from the surface of the ground, and the ground is hollowed out beneath it to the depth of from eight inches to a foot: it is somewhat pear-shaped, being about two feet in diameter at the ground, tapering to about one foot diameter at the top: it is built entirely of clay, two men can finish one in a few hours, and it is ready for use next day. The blast is supplied by two bellows, each made of a single goat's skin, with a bamboo nozzle: the two nozzles meet in a clay pipe, which passes about half-way through the furnace at the level of the ground, and by working the bellows alternately, a tolerably uniform blast is kept up; a semicircular opening, about a foot high and a foot in diameter at the bottom, is left in the furnace, and before each smelting, it is built up with clay. The furnace is then filled up with charcoal, and a lighted coal being introduced before the bellows, the fuel in the interior is soon kindled: as soon as this is accomplished, a small portion of the ore previously moistened with water, to prevent it from running through the charcoal, but without any description of flux, is laid on the top of the fuel, and charcoal is thrown over it to fill up the furnace: in this manner ore and fuel are added, and the bellows

plied for four hours or thereabouts, when the process is stopped; and the temporary wall in front of the furnace having been broken down, the bloom is removed by a pair of tongs from the bottom of the furnace: it is then beaten with a wooden mallet to separate as much of the vitrified oxide of iron as possible, and while still red hot, it is cut through the middle with a hatchet, in order to shew the quality of the interior of the mass: in this state it is sold to the blacksmiths, who perform all the subsequent operations of forging it into bars and making it into steel.

The process of forging the iron into bars is performed by sinking the blooms in a small charcoal furnace, and by repeated heatings and hammerings, to free it as much as possible from the vitrified and unreduced oxide of iron: it is thus formed into small bars about a foot long, an inch and half broad, and about half an inch thick; in this state the iron is full of cracks and exceedingly red short; and were an English manufacturer of steel to be told that cast-steel of excellent quality could be made from such iron, he would treat the assertion with great contempt.

It is from this unpromising material, however, that the Indian steel is always made; the bars of iron just described, are cut into small pieces to enable them to pack close in the crucible: a quantity of these pieces amounting to about half a pound, and from that to two pounds, as the mass of steel is required to be of greater or less weight, is then put into a crucible alone, with a tenth part by weight of dried wood chopped small, and the iron and wood are then covered over with one or two green leaves; the mouth of the crucible is then filled up by a handful of tempered clay, which is rammed in so close as to exclude the air perfectly.

The wood which is always selected to furnish carbon to the iron, is the *Cassia auriculata*, and the leaf used to cover the iron and wood is that of the *Asclepias gigantea*, or, where that is not to be had, that of the *Convolvulus laurifolius*. As soon as the clay, used to stop the mouths of the crucibles, is dry, they are built up in the form of an arch, with their bottoms inwards, in a small furnace urged by two goat-skin bellows; charcoal is heaped up over them, and the blast kept up without intermission for about two hours and a half, when it is stopped, and the process is considered complete: the furnace contains from twenty to twenty-four crucibles.

The crucibles are next removed from the furnace, and allowed to cool; they are then broken, and the steel which has been left to solidify is taken out in a cake, having the form of the bottom of the crucible; each cake is the produce of one crucible, and the steel is never

procured from a larger quantity. When the fusion has been perfect, the top of the cake is covered with striæ, radiating from the centre, but without any holes or rough projections on it; when the fusion has been less perfect, the surface of the cake has a honey-combed appearance, caused probably by particles of scoriæ and unreduced oxide in the bar-iron, and often contains projecting lumps of iron still in the malleable state.

The crucibles are formed of a red loam, which is very refractory, mixed with a large quantity of charred husk of rice; they are made by taking a lump of the tempered clay in one hand, and giving it a rotatory motion, while it is hollowed out by the fingers of the other hand: each crucible serves only for one operation.

The natives prepare the cakes of steel for being drawn into bars by annealing them for several hours in a charcoal fire, actuated by bellows, the current of air from which is made to play upon the cakes while turned over before it at a heat just short of that sufficient to melt them. It appears from this, that in order to insure the fusion of the contents of the crucible, it is found necessary to employ a larger dose of carbon than is required to form the hardest steel, and that this excess is afterwards got rid of by annealing the cakes before a current of air at a high heat, the oxygen of the air combining with and carrying off the excess of carbon in the gaseous form: without this operation none of the cakes would stand drawing into bars without breaking.

The only fuel employed by the natives of India throughout the different stages of iron and steel making is wood charcoal. The magnetic oxide of iron, when separated from the quartz with which it is naturally combined in the ore from which the wootz steel is made, consists of 72 per cent. of iron and 28 of oxygen. The native method of smelting the ore is so exceedingly imperfect, that the produce from their furnaces in bar-iron does not average more than fifteen per cent.

When specimens of Indian steel were first examined by chemists in England, they were quite unable to discover the process by which it had been manufactured. The late Dr. Pearson published an account of his examination of this substance in the seventeenth volume of the *Philosophical Transactions*, and the result of his observations is in these words: "We may without risk conclude that it is made directly from the ore, and consequently that it has never been in the state of wrought-iron." Dr. Buchanan's *Travels in the South of India* were published in the year 1807: they contain a very minute and correct account of the native processes of smelting iron and making it into steel, illustrated by engravings. Dr. Heyne's *Tracts on India*, were

published in 1814, and they also contain an account of both processes, along with a very interesting letter from the late Mr. Stoddart upon the quality of Indian steel, which he pronounces to be decidedly superior to any other description of steel; yet in page 223, of the first volume of the *Treatise on Metals*, lately published, it is stated, "that the wootz of India, in the state in which we receive it, is the immediate product of the ore, seems to be undoubted."

The principle of the Indian process is so different from that practised in England for making cast-steel, that it is not surprising that in the absence of all information upon the subject, Dr. Pearson should have formed an erroneous opinion as to its nature. It has always appeared to me one of the most astonishing facts in the history of the arts, that the Hindus should be in possession of a process, the theory of which is extremely recondite, and in the discovery of which, there seems so little room for the agency of chance: it is impossible to suppose, however, that the process was discovered by any scientific induction, for the theory of it can only be explained by the lights of modern chemistry: in fact, all speculation upon the origin of the discovery seems useless. It appears an easy matter to trace the successive steps of the steel manufacture in Europe. In Europe, steel seems first to have been made in modern times in Germany; the process consisted in partially decarbonating cast-iron in a finery, and bringing the metal under the hammer before the process for converting it into malleable iron was completed: this was, of course, the work of chance, as was also the further discovery that the iron manufactured from some kinds of iron ore, was fitter for making this natural steel, as it is called, than that made from other ore: this was for a long time the only description of steel made in Europe, and although the manufacture of cutlery has been established in England for some centuries, yet the only steel used for this purpose, for a very long period, was the natural steel of Germany.

As soon as chemical investigation had discovered that steel consisted of pure iron united to a very small proportion of carbon, an obvious experiment would be to endeavour to form steal by synthesis; and hence the process of subjecting pure malleable iron to a high heat in contact with carbon, producing blistered steel as the result. This step in the manufacture was found to be a great improvement upon the German steel, and the next step which would immediately suggest itself, that of welding several bars of blistered steel together, and drawing them down into a single bar under a very heavy hammer, forming what is called shear-steel, was found still further to improve the quality; still it was found that all these descriptions of steel possessed defects which rendered them unfit for purposes which required a high polish and a fine and strong edge: these defects could evidently be traced

to impurities in the body of the steel, or variations in its quality; and it would seem an obvious suggestion to endeavour to equalize the quality of the steel by reducing it to the fluid state in a close vessel, so as to prevent the dissipation of its carbon by exposure to the air at a high temperature. This is, in fact, the process now followed in England for making cast-steel, which is the only description of steel fit for fine cutlery; and simple and inartificial as the process appears, it was only discovered in England about the middle of the last century.

The antiquity of the Indian process is no less astonishing than its ingenuity. We can hardly doubt that the tools with which the Egyptians covered their obelisks and temples of porphyry and syenite with hieroglyphics were made of Indian steel. There is no evidence to shew that any of the nations of antiquity besides the Hindús were acquainted with the art of making steel. The notices which occur in the Greek and Latin writers on this subject serve only to betray their ignorance of it: they were acquainted with the qualities and familiar with the use of steel, but they appear to have been altogether ignorant of the mode in which it was prepared from iron. The arms and cutting instruments of the ancients were all formed of alloys of copper and tin, and we are certain that tools of such an alloy could not have been employed in sculpturing porphyry and syenite.

Had the ancient nations of the west been in possession of the process of converting iron into steel, there can be no doubt that they would have used it in the fabrication of their arms, for in all parts of the world where steel is made, it can be sold much cheaper than copper. The price of steel in India is about one-fifth of the price of copper, but the expense of transporting it from India to Europe and Egypt by the ancient routes of commerce would have enhanced its price so much as to restrict the use of it to such articles as required to be possessed of a degree of hardness which could not be imparted to any other metal. One certain fact has reached us regarding the antiquity of the steel manufacture in India: Quintus Curtius mentions that a present of steel was made to Alexander of Macedon, by Porus, an Indian chief, whose country he had invaded. We can hardly believe that a matter of about thirty pounds weight of steel would have been considered a present worthy the acceptance of the conqueror of the world, had the manufacture of that substance been practised by any of the nations of the west in the days of Alexander. We may judge from the extent of the present, how much the cost of the article had been enhanced by transport from the place of its manufacture to the country of Porus.

We know that a maritime intercourse was maintained from the remotest antiquity between the Malabar coast, the Persian Gulf, the coun-

try about the mouths of the Indus and the Red Sea; and it appears reasonable to conclude that the steel of the South of India found its way by these routes to the country of Porus, to the nations of Europe, and to Egypt.

It appears then that the claim of India to a discovery which has exercised more influence on the arts conducive to civilization and manufacturing industry, than any other within the whole range of human inventions, is altogether unquestionable. What a theme for a reflective mind is the consideration of what would have been the social condition of the human race had the art of converting iron into steel still remained undiscovered.

A few remarks seem called for, regarding the distinguishing peculiarity of the Indian process of steel-making.

It will have been observed that it differs from the ordinary English process, from the circumstance of the iron being put into the crucible in the pure state, and without having gone through the process of cementation or conversion into blistered steel.

That iron could be converted into cast-steel by fusing it in a close vessel in contact with carbon, was a discovery made by Mr. D. Mushet about the year 1800. This was undoubtedly the original idea of a man of talent, following the light thrown on the theory of steel-making by the discoveries of modern chemistry. The substances Mr. Mushet proposed to use, were " charcoal-dust, pitcoal-dust, plumbago, or any substance containing the coaly or carbonaceous principle." Now this specification unquestionably comprises the principle of the Indian process, which adopts the use of dry wood, which is a "substance containing the coaly or carbonaceous principle." I believe, however, that Mr. Mushet*, in practice, confined himself to the use of charcoal-powder in preference to dry wood, in consequence of the comparatively small bulk of the former required to carbonate the iron, and the consequent saving of space in the crucible.

In the year 1825, Mr. Charles Mackintosh† took out a patent for converting iron into steel by exposing it to the action of carburetted-hydrogen gas in a close vessel, at a very high temperature, by which

* Mr. Mushet took out a patent for this process, but, owing to causes entirely unconnected with the merits of the discovery, it was never successfully carried into practice.

† The patentee of the Indian-rubber waterproof fabrics. Mr. Mackintosh also took out a patent for his process for steel-making; but although I have seen samples of the steel made in this way, yet the process was not found to answer on a large scale: it was found impossible to keep the chambers in which the bars of iron were suspended air-tight at the very high temperature to which it was necessary to raise them in order to enable the iron to combine with the gaseous carbon.

means the process of conversion is completed in a few hours, while by the old method it was the work of from fourteen to twenty days.

Now it appears to me that the Indian process combines the principles of both the above described methods: on elevating the temperature of the crucible containing pure iron and dry wood and green leaves, an abundant evolution of carburetted-hydrogen gas would take place from the vegetable matter, and as its escape would be prevented by the luting at the mouth of the crucible, it would be retained in contact with the iron, which, at a high temperature, appears from Mr. Mackintosh's process to have a much greater affinity for gaseous than for concrete carbon; this would greatly shorten the operation, and probably at a much lower temperature than were the iron in contact with charcoal powder. In no other way can I account for the fact that iron is converted into cast-steel by the natives of India in two hours and a half, with an application of heat, that, in this country, would be considered quite inadequate to produce such an effect, while at Sheffield it requires at least four hours to melt blistered steel in wind furnaces of the best construction, although the crucibles, in which the steel is melted, are at a white heat when the metal is put into them, and in the Indian process, the crucibles are put into the furnace quite cold.

I do not believe that the Indian process exercises any influence upon the quality of the steel; its only advantage appears to be that it enables the Hindú to accomplish an object with the very imperfect means of applying heat within his reach, which it would be altogether hopeless for him to attempt, were he to imitate the steps of the European process.

It seems probable that the selection of particular kinds of vegetable matter to afford carbon to the iron, may not be altogether a matter of fancy. The Indian steel-maker of course knows nothing of the theory of his operations: he is satisfied with knowing that he can convert iron into steel by fusing it with what he calls "medicine," and this medicine experience has taught him must be dried wood and green leaves; and as different woods and leaves very probably contain carburetted-hydrogen in very different proportions, experience may have taught the Hindoo that he can make iron pass into the state of steel more quickly and with a smaller bulk of particular kinds of vegetable matter, than with others. The *Cassia auriculata* is the only wood I have ever seen used for the purpose; it contains a large quantity of the extract called catechu: the leaf of the *asclepias* contains an acrid milky juice: the leaf of the *convolvulus* is in no respect remarkable.—*Journal of the Royal Asiatic Society*, vol. 5, p. 390-7.

XI.—*Proceedings of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.*

13*th January* 1840.—*The Annual General Meeting of the Society :— The Hon. Sir* Robert Comyn, *President, in the Chair.*

The Secretary submitted to the Meeting, their statements of the Society's account for the past year.

Abstract Statement of the Funds of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, from the 1*st January, to the* 31*st December* 1839.

	Disbursements.			Receipts.		
Balance in favour of the Society as exhibited in the statement submitted to the annual General Meeting, held on the 30th January 1839.	....	..	..	482	11	9
Total Amount of subscriptions received from the 1st January to the 31st December 1839	....	..	..	4270	5	4
Difference of interest in favour of the Society as stated in Messrs. Binny and Co's account closed on the 31st December 1839........	....	..	..	13	12	9
Messrs. Binny and Co's. commission on amount of receipts.......	42	11	3			
Remitted to Messrs. Wm. H Allen and Co. booksellers...........................	2042	8	10			
Pay of the Establishment....................	1599	4	0			
Postage....................................	78	10	0			
Stationery......	35	1	0			
Cooly hire................................	2	0	6			
Sundries	41	0	0			
Expenses incurred in binding books........	18	0	3			
Subscriptions for the Bombay Courier and Army List............................	68	0	0			
Subscriptions for the Bengal Herald and Army List.	34	0	0			
Books purchased at Madras	64	8	0			
Paid for printing advertisements, &c......	9	1	0			
Paid for printing the Catalogue of the books in the Library	92	12	0			
Paid for paper to print the Catalogue........	42	0	0			
	4169	8	10	4766	13	10
Deduct disbursements..................				4169	8	10
Balance in favour of the Society................				597	5	0

Abstract Statement of the Funds of the Asiatic Department.

	Disbursements			Receipts		
Balance in favour of the Society as exhibited in the statement, submitted to the annual General Meeting, held on the 30th January 1839	....	..	..	1107	7	0
Total amount of subscriptions received from the Ist January to the 31st December 1839..	....	..	..	1056	10	8
Amount realized by the sale of the Madras Journal of Literature and Science	....	..	..	1243*	0	0
Difference of interest in favour of the Society as stated in Messrs. Binny and Co's. account current closed on the 31st December 1839..	....	..	..	4	9	5
Messrs. Binny and Co's. commission on amount of receipts	22	15	11			
Remitted to Messrs W. H. Allen and Co. for printing paper	1043	7	7			
Paid for printing the 22d, 23d and 24th Nos. of the Madras Journal of Literature and Science	1002	15	0			
Pay of the Establishment	798	0	0			
Sundries	42	0	0			
Paid freight, &c. on four boxes of books to London	41	2	7			
	2950	9	1	3411	11	1
Deduct disbursements				2950	9	1
Balance in favour of the Society				461	2	0

The following donations having been made to the Society since the last Annual General Meeting, the thanks of the Society were unanimously voted to the donors:—

Trevandrum Almanac for 1839................J. Caldecott, Esq.

Jervis's Address on the various Surveys and other Scientific enquiries instituted by the Honourable East India Company throughout Asia..................Major T. B. Jervis.

Martin's Eastern India 3 vols.........................Madras Government.

Lord Brougham's Speeches 4 vols....................Hon. Sir R. Comyn.

The Rev. Mr. Taylor's Examination and Analysis of Col. Mackenzie's Manuscripts 10 copies.........Madras Government.

Notice Historique et Littéraire sur M. Le Baron Silvestre De Sacy................................Mons. Reinaud.

Evidences taken before the Houses of Parliament at the last renewal of the Charter..................J. C. Morris, Esq.

The Rev. Mr. Taylor's two first Reports on the Mackenzie Manuscripts, reprinted at Calcutta........Rev. W. Taylor.

* Amount since realized and remitted to Messrs. Binny and Co. from the sale of the Journal Rupees 117.

Rask's Samlede Afhandlinger 3d vol................Royal Society of Northern Antiquities.
Mémoire Sur la Découvette de l'Amérique au dixième Siècle.. do.
A Map of Vinland.. do.
General Chart exhibiting the discoveries of the Northmen in the Arctic Regions and America. ...... do.
Island á of anverdri tuindu öld eptir krists burd okum aldamótin ar 1000 .... do.
Julianeshaabs district Sandsynligviis indbefattende Oslerbygden.. de.
Miller on Law..Hon. Sir R. Comyn.
Oriental books and manuscripts......................Lieut. Newbold.
List of Minerals collected from various parts of the Nizam's territories, the Ceded Districts, Kurnool, the Southern Mahratta Country, Mysore, &c.......... do.
Rev. Mr. Spring's Malayalum Grammar......... ....Rev. F. Spring.
Vertebra of a Whale, picked up on the shore at Pulicat. do.

It was announced to the Meeting that the following gentlemen have been elected members of the Society since the last Annual General Meeting :—

Thomas Clarke, Esq
W. H. Bayley, Esq.
A. Mellor, Esq.
A. P. Forbes, Esq.
Major Moberly,
Captain W. Orr,
Z. Macaulay, Esq.

During the past year the Society has lost 16 members by death, retirement, or departure for Europe.

Read the following letter:—

ROYAL GEOGRAPHICAL SOCIETY.

London, 1*st August* 1839.

Sir,

I have the honor to acquaint you that in accordance with the suggestion of Major T. B. Jervis, Surveyor General of India, the Council of this Society has resolved to present a complete set of its Journal to the public library of each of the ten principal stations in India, and I have now the pleasure to forward a copy consisting of nine volumes for the Library of the Literary Society at Madras, which I am to request you will be pleased to present in the name of the Geographical Society of London.

In making this communication the Council beg to express their hope that this Journal may prove useful to officers who may be about to

undertake journeys in the various parts of India and in the adjacent countries; and also to make known to them that there exists a Society in London specially devoted to the advancement of geography, which will gladly receive, and publish in the best form, the correct account of any journey through a country of which our geographical information may be imperfect, as is the case throughout almost the whole of the vast continent of Asia.

We shall be thankful also for any new maps or works containing topographical details respecting the hitherto undescribed parts of the country adjoining Madras, which may be published in India.

I am desired to express the best thanks of this Society for the donation of the excellent Journal of the 'Madras Literary and Scientific Society' which you have had the kindness to forward to us, and to state that in future we shall gladly exchange our volumes against those published by your Society.

To the Secretary of the
Madras Literary Society, &c.

I am Sir,
Your obedient servant.
JOHN WASHINGTON,
Secretary.

P. S.—The nine other stations are Calcutta, Bombay, Hydrabad, Bangalore, Dum-dum, M'how, Delhi, Meerut and Cawnpoor; which I mention in order that officers moving from one station to another, and desirous of consulting the London Geographical Journal, may know where to find it.

I also enclose two copies of a printed paper of Hints for collecting Geographical information—which I shall be obliged to you to allow to lie on your table and be made public.

Resolved.—That the thanks of this Society be communicated to the Geographical Society, with the expression of the willingness of this Society to accede to the request to exchange Journals.*

Read a letter from Lieutenant Newbold, dated 31st December 1839, forwarding for the acceptance of the Society, several oriental books and manuscripts, and the thanks of the Society were unanimously voted to him for his valuable donation.

* The Madras Journal has been regularly forwarded for presentation to the Royal Geographical Society since 1836.—ED.

Read a letter from the same gentleman, dated the 31st December 1839, transmitting for presentation to the Society, a list of minerals collected from various parts of the Nizam's territories, the Ceded Districts, Kurnool, the Southern Mahratta Country, Mysore, &c., and requesting that it may be published in the first No. of the Journal that shall issue after the Meeting. Thanks were likewise voted to him for this donation.

Read a letter from the Rev. F. Spring, dated 13th January 1840, offering for the acceptance of the Society, a copy of his Malayalum Grammar, which he published last year, and for the museum the vertebra of a whale which was picked up on the shore at Pulicat. The thanks of the Meeting were unanimously voted to him for his donation.

The Meeting proceeded to elect three members for the Committee of Management for the ensuing year, in succession to J. C. Morris Esq. C. T. Kaye Esq. and J. Ouchterlony Esq. who go out by rotation; when A. D. Campbell Esq. and N. B. Acworth Esq were duly elected, and J. Ouchterlony Esq. re-elected.

The business of the Meeting being concluded, the thanks of the Meeting were unanimously voted to the Honourable the President for his able conduct in the Chair.

J. Minchin, *Secretary.* Robert Comyn, *President.*

Thursday Evening, 13*th February* 1840.—*The Venerable Archdeacon* Harper *in the Chair.*

It was intimated that the immediate purpose of the present meeting was (in the words of the requisition), "with the view of establishing regular periodical meetings; when members should be requested to bring with them, as visitors, any friends who feel an interest in the proceedings of the Society."

This question having been put to the meeting, it was unanimously resolved that a meeting of the Society shall take place on the first Thursday of every month; and, after some discussion, it was determined that 8 o'clock in the evening should be the hour for the commencement of business.

The following works were presented :—

Journal of the Asiatic Society of Bengal for September and October 1839.—By the Asiatic Society.

Captain Low's Dissertation on Penang and Province Wellesley.—By Lieutenant T. J. NEWBOLD.

A help in acquiring a knowledge of the English language (English and Canarese). By the same.

Journal of a Tour along the coast of Java and Bali, &c. do.

Aperçu Général sur le Territoire D'Arménie. do.

The Risalah of Shekh Alkhatub—(Arabic). do.

Tasikhi Ferishta. [do.

The History of Seringapatam and Madras in Persian. do.

The translation of the Gospels into Malay.—By Mr. R. L. BRUEYN, Batavia 1832. do.

The Poems of Amir Khusroo (in Persian). do.

The thanks of the Society were voted to the donors.

The following communications to the Society were laid before the meeting :—

A description of a new species of Coluber (Naia), by WALTER ELLIOT Esq.

This paper was read and discussed by the meeting ; the stuffed skin of the animal, and a large coloured drawing, were exhibited.

(Published in our present number.)

Notes, principally geological, on Southern India, by Lieut. NEWBOLD, with illustrative specimens of rocks.

(Published in this number.)

Continuation of Mr. JERDON's Ornithology of Southern India.

60 original drawings of birds, by native artists, coloured from nature under Mr. JERDON's own direction, were laid on the table, and excited general admiration at their beauty as works of art, and their fidelity to nature. It was intimated that Mr. JERDON was desirous of publishing a series in lithograph, in the style of those given in illustration of his Catalogue in this Journal.

An account of the direction taken, and effects produced, by a current of electric fluid, which struck the house at the top of Palaveram hill, the property of Colonel MONTEITH, who witnessed the event :—Communicated by T. J. TAYLOR, Esq. H. C. Astronomer (with a plan).

A brief sketch of the Life and Writings of Father BESCHI, or VIRAMAMUNI:—Translated from the original Tamil, by A. MUTTUSAMI PILLEI, manager of the College of Fort St. George, and Moonshee to the Tamil Translator to Government.

Some singular spheroidal mineral masses were laid before the meeting by Mr. Elliot and Lieut. Cotton, forwarded by Assistant Surgeon J. Sanderson. They were found 5 miles west of the village of Streepermadoor, in the district of Chingleput, at a depth of from 2 to 3 feet from the surface, in the gravel of the laterite formation. These spheroids were about the size of cocoa-nuts, to which they bore some general resemblance, so as to have conveyed the idea of their being actually fossils, when they were first removed from their matrix. They are hollow within, or contain some aluminous earth, and the shell is composed of a kind of sandstone grit, very hard and compact, consisting of a dark ferrugenous paste, embedding minute fragments of quartz.

Specimens of the supposed fossils from the Peam Gunga River in the Hyderabad country, mentioned at p. 477 of the 19th No. of this Journal, were on the table, and excited much speculation as to their nature; the result of which will be noticed at a future time.

Thursday Evening, 5th March 1840.—*The Hon. Sir* ROBERT COMYN, *President, in the Chair.*

The following work, presented to the Society, was laid on the table:—

Journal of the Asiatic Society of Bengal for November 1839.—By the Asiatic Society.

The thanks of the Society were voted for the same.

The following communications to the Society were laid before the meeting:

Colonel MONTEITH's continuation of his Translation of Count Meyendorff's Journey from Orenbourg to Bokhara.

Mr. C. P. BROWN's Essay on the Creed, Customs and Literature of the Jangams—(Read to the Meeting, and published in our present No.)

Thursday Evening, 2d April 1840.—Dr. Wylie, *in the Chair.*

The following books, presented to the Society, were laid on the table :—

Result of Observations at the Madras Observatory for 1838 and 1839. —By the Madras Government.

Narrative of the Discoveries of Sir Charles Bell in the Nervous System—By Alexander Shaw, Esq.—Presented, on the part of the author, by James Shaw, Esq.

The following communication to the Society was presented :—

Captain J. Campbell on a supposed new mineral, a Titanate of Magnesia.

Thursday Evening, 7th May 1840.—A. D. Campbell, Esq. *President of the Committee of Papers, in the Chair.*

The following work, presented to the Society, was laid on the table, and thanks voted for the same :—

Mr. Piddington's Pamphlet on the Law of storms as applying to the tempests of the Indian and Chinese seas.—By the Government of India.

The following communications to the Society were presented:—

Continuation of the Catalogue of the Birds of Southern India, by T. C. Jerdon, Esq.—Tribe *Scansores.*

Account of a carboniferous stratum at Baypoor, near Calicut, Malabar coast. By Lieut. Newbold (Read to the meeting).

Desiderata in Indian Geology. By the same.

Specimens of the silicified wood from Turivacary, with lateritic rock, which appears to be the matrix in which the fossil is found, were presented in the name of C. T. Kaye Esq. of the Civil Service.

Specimens from the same locality were also presented, received from Lieut. Newbold; also specimens of the shell limestone deposit near Pondicherry, presented by the same gentleman.

Note to page 86.

We must be excused from entering into a disquisition on the mineralogical differences of rocks, which would lead to endless, and, we fear, fruitless controversy. It is not the practice of the Editors of this Journal to remark on the communications of those who address the Society; the facts narrated and the opinions maintained are considered to be exclusively on the responsibility of the authors, and as such are usually submitted, without comment, to the Press. The Editorial note appended to our last number was not intended to be in contravention of Captain Campbell's statements, but solely to vindicate the scientific character of a respected correspondent now no more. We still maintain that Dr. Benza describes no other rock specifically than the hornblende rock or greenstone found *in situ* at Seringapatam; on the authority of Buchanan, and deceived by the external resemblance between that rock and the material of the pillars, he states, in general terms, the identity of the two; but he did not examine the *internal structure* of the pillars, nor did he visit the quarry at Cudhully; if he had, we are quite sure he would not have pronounced either of them to be hornblende.

We must here mention, however, that we have been led into an error regarding Lieut. Newbold's specimen, by the circumstance of his stating the pillars at Seringapatam and the stone of the quarry at Cudhully to be a variety only of the steatite which he was describing a specimen of from another locality. The latter is undoubtedly what he termed it; and the former is evidently one of the numerous varieties of serpentine, a nearly allied rock to steatite; judging from Lieut. Newbold's specimen, and also from a fragment from the pillars themselves, politely sent down to Madras by Captain Campbell for our inspection.—Editor.

Note to page 40.

With reference to the colour of the Naga, Mr. Elliot subsequently writes, "it should be dark yellowish-ash, I think, but really the hue puzzles me."—Editor.

XII.—*Horary Meteorological Observations made agreeably with the suggestions of Sir* John Herschel.

At the Madras Observatory.—By T. G. Taylor, Esq. *H. E. I. C Astronomer.*

Date.	Time.	Barometer.	Thermometer.	Wet bulb.	Direction of wind.	Strength of wind.	Remarks.
Dec. 21	6 A. M.	30,100	71,8	68,5	N	1	Flying clouds, gentle wind.
	7	30,110	72,0	68,5	N	1	Flying clouds, do. do.
	8	30,150	74,0	70,0	N W	1	Haze do. do.
	9	30,170	76,6	72,0	N	1	Do. do. do.
	10	30,174	79,0	73,8	N	2,3	Flying clouds, strong wind.
	11	30,168	79,8	76,1	N N E	2,3	Flying clouds, do. do.
	12	30,136	80,8	72,5	N E	2	Cloudy do. do.
	1 P. M.	30,100	79,7	72,4	N E	2	Do. do. do.
	2	30,086	79,5	72,5	E N E	2	Do. do. do.
	3	30,073	78,8	72,0	N E	3	Do. do. do.
	4	30,064	78,8	70,5	N N E	2,3	Thick haze do. do.
	5	30,072	77,8	70,3	N E	2,3	Do. do. do. do.
	6	30,084	76,4	69,5	N E	2	Haze, moderate wind.
	7	30,102	76,0	69,5	N E	2	Do. do. do.
	8	30,122	75,9	69,3	N E	1	Do. gentle wind.
	9	30,132	75,9	69,3	N E	1	Do. do. do.
	10	30,130	75,7	69,5	N E	1	Flying clouds do. do. dew.
	11	30,120	74,8	69,5	N E	1	Do. do. do. dew.
	12	30,112	72,4	69,0	N	1	Do. do. do. dew.
	1 A. M.	30,084	72,3	68,9	N	1	Do. do. do. dew.
	2	30,058	72,2	68,5	N W	1	Do. do. do. dew.
	3	30,034	72,0	68,4	N W	1	Do. do. do. dew.
	4	30,044	71,6	68,2	N W	1	Clear do. do. dew.
	5	30,038	71,4	68,5	N W	1	Clear do. do. dew.
22	6	30,062	70,3	68,5	N W	1	Flying clouds do. dew.
	7	30,082	70,8	69,3	N W	1	Do. moderate wind.
	8	30,106	72,9	70,7	N	1	Do. gentle wind.
	9	30,124	76,2	72,5	N	1	Clear do. do.
	10	30,132	78,7	72,7	N	1,2	Flying clouds, strong wind.
	11	30,122	79,8	72,0	N E	1,2	Do. moderate wind.
	12	30,092	79,6	71,5	E by N	1,2	Do. do. do.
	1 P. M.	30,065	80,3	71,3	N E	1,2	Do. do. do.
	2	30,050	80,6	71,3	E N E	1,2	Do. do. do.
	3	30,026	80,6	72,5	N N E	1,2	Do. do. do.
	4	30,040	80,4	71,9	N E by E	1,2	Do. do. do.
	5	30,066	79,0	72,5	N E	1,2	Clear do. do.
	6	30,060	77,2	70,8	N E	1	Clear gentle wind.

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY; FOR THE MONTH OF OCTOBER, 1839.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Ther. at 10 A. M.	Ther. at 4 P. M.	Ther. at 10 P. M.	Wet Bulb 10 A. M.	Wet Bulb 4 P. M.	Wet Bulb 10 P. M.	Rain Sun-rise.	Rain Sun-set.	Evaporation.	Direction of Wind 10 A. M.	Direction of Wind 4 P. M.	Direction of Wind 10 P. M.	Weather 10 A. M.	Weather 4 P. M.	Weather 10 P. M.	Remarks.
1839	Inch.	Inch.	Inch.	o	o	o	o	o	o										
Oct. 1	29,944	29,842	29,942	86,0	89,0	85,7	7,5	8,0	7,1	......	......	......	S W	S E	S W	Clear	Cloudy	Fl. cl.	lightning.—dew.
2	,974	,876	,980	85,0	89,6	86,6	6,4	6,6	6,0	......	......	2,650	W	W	S	Haze	Cloudy	Cloudy	do.
3	,994	,874	,984	86,0	89,-	84,9	7,5	7,5	8,9	......	......	......	S W	E	S	Cloudy	Cloudy	Do.	do.
4	,974	,860	,956	85,6	89,4	85,7	7,6	9,4	4,3	......	......	......	W	E	S	Clear	Do.	Fl. cl.	do. dew.
5	,960	,886	—	85,8	89,5	—	8,4	9,0	—	......	......	......	W	E	—	Do.	Fl. cl.	Haze	do.
6	,988	—	,968	86,3	—	86,6	5,1	—	5,4	......	......	......	S	—	S	Fly. cl.	—	Fl. cl.	do.
7	,990	,870	,954	85,6	88,5	86,8	7,3	7,6	5,2	......	......	......	S W	S	S W	Haze	Fl. cl.	Do.	do.
8	,988	,864	,950	85,1	89,0	86,2	7,1	5,5	4,0	......	......	......	W	S. SE	S	Cloudy	Fl. cl.	Do.	do. thun. in the evening.
9	,950	,838	,936	86,7	89,4	84,9	5,2	8,0	5,0	......	......	2,771	W	NE. E	N E	Clear	Th. hz.	Clear	do.
10	,950	,838	,922	87,0	88,5	83,2	8,0	8,5	2,6	......	......	......	E	E	E	Fly. cl.	Haze	Do.	do.
11	,950	,832	,912	85,9	88,0	84,3	5,9	8,0	5,1	......	......	......	W	E	S E	Haze	Th. hz.	Haze	do.
12	,942	,844	,902	86,4	88,5	82,9	6,4	8,0	3,1	......	......	......	S W	E	S W	Fly cl.	Cloudy	Clear	do.
13	,940	—	,922	84,8	—	85,0	5,8	—	3,1	......	......	......	S W	—	S	Haze	—	Fly. cl.	do.
14	,950	,830	,930	86,0	89,0	85,0	6,5	7,0	6,0	......	......	......	S W	S E	S W	Do.	Fl. cl.	Cloudy	thunder & vivid lightning.
15	,960	—	,942	85,9	—	82,4	6,9	—	2,7	......	......	......	W	—	S E	Clear	—	Clear	lightning dew.
16	,966	—	,962	86,3	—	82,5	12,3	—	6,5	......	......	2,571	S E	—	E	Do.	—	Do.	do. do.
17	,994	—	30,010	84,7	—	83,9	7,2	—	8,4	......	......	......	W	—	E	Do.	—	Do.	do. do.
18	30,040	—	,014	84,8	—	83,3	7,8	—	7,3	......	......	......	S E	—	E	Do.	—	Do.	— do.
19	,050	—	,018	84,7	—	81,9	6,7	—	7,1	......	......	......	S	—	N E	Do.	—	Do.	— do.
20	,036	—	,000	84,9	—	82,0	7,4	—	—	......	0,215	......	S W	—	—	Fly. cl.	—	Do.	lightning. do.
21	,024	,916	29,973	84,3	86,8	82,0	6,3	8,3	—	......	......	......	E	E. SE	—	Fly, cl.	Clear	Do.	do. do.
22	,010	,902	,960	85,5	85,7	—	6,5	5,7	—	......	......	2,537	S W	E. NE	—	Fly. cl.	Fl. cl.	Do.	do. do.
23	,046	,943	—	85,1	85,6	—	5,6	12,1	—	......	......	......	E	E	—	Cloudy	Haze	—	do. do.
24	,066	,984	—	84,3	85,4	—	9,3	5,9	—	......	......	......	E	N E	—	Fly. cl.	Fl. cl.	—	do. do.
25	,084	,988	—	83,3	83,4	—	10,3	10,4	—	......	......	......	N E	N. NE	—	Haze.	Fl. cl.	—	do. —
26	,062	,961	—	82,8	85,0	—	5,8	8,0	—	......	......	......	N E	E	—	Fly. cl.	Th. hz.	—	— dew.
27	,017	—	29,980	83,3	—	81,9	5,1	—	6,7	0,345	......	......	W N W	—	E	Fly. cl.	—	Clear	lightning. dew.
28	,038	,954	—	84,0	86,0	—	5,0	7,5	—	......	......	......	N E	N E	—	Clear	Clear	—	do. dew.
29	,046	,966	30,050	84,8	85,7	84,6	5,9	7,2	5,1	......	......	......	N E	E. NE	N E	Fly. cl.	Fl, cl.	Clear	do. —
30	,100	,976	,036	83,7	84,3	82,8	4,2	6,8	4,8	0,432	......	2,924	S E	N E	N E	Cloudy	Cloudy	Fl. cl.	do. —
31	,080	,976	,050	84,0	84,5	82,2	4,5	8,0	4,4	......	......	......	N E	N E	N E	Do.	Fl. cl.	Cloudy	do. thunder.
Mean	30,004	29,901	29,970	85,1	87,3	84,1	6,8	7,9	5,4										

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY; FOR THE MONTH OF NOVEMBER, 1839.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Ther. at 10 A. M.	Ther. at 4 P. M.	Ther. at 10 P. M.	Wet Bulb. 10 A. M.	Wet Bulb. 4 P. M.	Wet Bulb. 10 P. M.	Rain. Sun-rise.	Rain. Sun-set.	Evaporation.	Direction of wind. 10 A. M.	Direction of wind. 4 P. M.	Direction of wind. 10 P. M.	Weather. 10 A. M.	Weather. 4 P. M.	Weather. 10 P. M.	Remarks.
1839	Inch.	Inch.	Inch.	o	o	o	o	o	o										
Nov. 1	30,052	29,914	30,036	76,3	80,4	79,0	1,3	2,4	0,5	2,208	0,356	......	N	N by E	N W	Cloudy	Cloudy	Cloudy	—lightning and thunder.
2	,072	,986	,038	75,1	77,7	78,4	1,6	1,4	1,7	1,147	0,864	......	N E	N W	N E	Rain	Rain	Cloudy	do. do.
3	,098	30,000	,074	79,7	80,5	79,6	1,3	2,0	2,6	0,079	0,257	......	N	N. N W	S W	Driz.ra.	Cloudy	Rain	do. do.
4	,104	29,996	,062	78,0	81,0	79,5	0,0	2,0	1,4	1,798	0,637	......	N E	E.	E	Cloudy	Cloudy	Cloudy	do. do.
5	,106	,990	,050	77,6	78,6	77.8	0,1	0,6	0,2	0,947	0,874	......	N E	NwbyN	N	Rain	Cloudy	Rain	do. do.
6	,050	,965	,050	79,3	77,0	77,0	1,3	1,5	0,1	0,307	1,091	1,363	N	N E	N W	Cloudy	Rain	Cloudy	do. do.
7	,078	,947	,004	80,3	81,2	79,2	3,8	4,7	1,8	0,010	......	......	N	N N E	N	Fl. cl.	Cloudy	Fl. cl.	do. do.
8	,008	,910	29,986	76,8	78,0	77,6	0,7	0,0	0,6	0,122	2,516	......	N	N	N. N W	Cloudy	Cloudy	Cloudy	do. do.
9	29,968	,904	30,010	77,9	78,0	77,0	0,4	0,8	0,5	1,057	1,234	......	S E	N	SE. E	Cloudy	Cloudy	Cloudy	do. do.
10	,998	,900	29,988	76,6	79,6	77,0	0,1	1,6	0,4	0,467	......	......	Calm	Calm	N W	Cloudy	Cloudy	Cloudy	—lightning.
11	30,010	,885	,950	77,1	78,4	77,0	0,3	2,4	1,6	......	......	......	N W	N N W	N W	Rain	Cloudy	Cloudy	do.
12	29,996	,914	,990	77,5	77,2	75,8	2,5	1,2	0,2	......	......	......	N W	N N W	N. N W	Cloudy	Cloudy	Drizzling ra.	do.
13	30,012	,940	30,010	74,7	75,2	75,0	0,7	0,2	0,2	2,810	2,234	......	N W	N W	N W	Rain	Cloudy	Cloudy	—lightning.
14	,012	,898	29,972	77,2	80,0	75,3	3,4	7,7	2,8	0,094	......	2,312	N W	N	N W	Th. haze	Th. hz.	Fl. cl.	do.
15	29,972	,848	,910	78,1	79,6	76,0	12,1	10,6	6,0	......	......	......	N W	N W	N W	Haze	Th. hz.	Cloudy	——
16	,926	,812	,884	77,2	82,3	77,9	7,2	11,8	5,9	......	......	......	W	S W	S W	Clear	Haze	Haze	dew.
17	,940	,834	,946	77,8	82,5	80,5	6,8	5,0	3,5	......	......	......	S W	S W	S	Clear	Clear	Fl. cl.	do.
18	,968	,862	,968	79,9	84,4	80,2	5,7	5,9	3,2	......	......	......	S W	S E	S E	Clear	Clear	Clear	do.
19	30,026	,905	,986	81,0	84,3	81,0	5,0	5,8	3,4	......	......	......	S W	S E	S E	Clear	Clear	Quite cle.	do.
20	,010	,900	,976	81,2	84.0	80,4	4,2	7,0	4,4	......	......	2,075	S W	S E	Calm	Clear	Clear	Clear	do.
21	,008	,904	,994	81,6	82,4	78,4	3,6	3,9	2,9	......	0,160	......	S W	N. NE	N	Clear	Cloudy	Clear	do.
22	,052	,950	30,036	80,3	83,2	79,8	2,8	8,5	4,3	......	......	......	S W	E. NE	E	Clear	Clear	Clear	do.
23	,122	30,024	,120	80,4	82,0	79,3	4,4	11,3	3,9	......	......	......	N E	N. NE	N E	Clear	Clear	Clear	do.
24	,138	,050	,112	80,3	81,8	79,7	4,3	11,3	3,7	......	......	......	N E	N. NE	N E	Fl. cl.	Fl. cl.	Fl. cl.	do.
25	,164	,072	,150	81,7	82,0	78,0	8.2	9,5	5,5	......	......	......	N E	N E	N E	Fl. cl.	Fl. cl.	Fl. cl.	——
26	,158	,076	,162	80,9	82,0	80,5	6,9	6,7	6,5	......	......	......	N E	N E	N	Fl. cl.	Cloudy	Cloudy	——
27	,190	,098	,168	81,2	82,4	78,6	8,1	10,4	9,2	......	......	2,596	N	N E	N. N E	Cloudy	Fl. cl.	Clear	——
28	,168	,074	,150	78,8	81,0	79,6	7,3	10,0	9,6	......	......	......	N	N. NE	N. N E	Cloudy	Cloudy	Fl. cl.	——
29	,184	,076	,140	81,2	82,4	77,6	10,2	10,9	6,5	......	......	......	N E	E. NE	N E	Fl. cl.	Fl. cl.	Clear	dew.
30	,178	,076	,146	80,0	82,0	76,0	8,0	9,5	7,5	......	......	......	N E	N. E.	N	Clear	Fl. cl.	Fl. cl.	do.
Mean	30,059	29,957	30,036	78,9	80,7	78,3	4,1	5,6	3,4										

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY; FOR THE MONTH OF DECEMBER, 1839.

Days.	Barometer at			Ther. at			Wet Bulb.			Rain.		Evaporation.	Direction of Wind.			Weather.		Remarks.
	10 A. M.	4 P. M.	10 P. M.	10 A. M.	4 P. M.	10 P. M.	10 A. M.	4 P. M.	10 P. M.	Sun-rise.	Sun-set.		10 A. M.	4 P. M.	10 P. M.	10 A. M.	4 P. M.	10 P. M.
1839	Inch.	Inch.	Inch.	°	°	°	°	°	°									
Dec. 1	30,196	30,100	30,174	80,0	81,5	79,0	10,0	8,5	9,5	......	......	......	N E	N E	N E	Cloudy	Fl. cl.	Flying clouds—dew—lightning.
2	30,188	,114	,240	79,6	83,0	78,5	10,6	13,3	5,0	......	......	......	N	N N E	N	Clear	Clear	Clear
3	30.194	,100	,182	81,0	82,0	79,2	9,6	10,5	7,7	......	......	......	N E	N E	N E	Clear	Clear	Flying clouds.
4	30,200	,102	,170	78,9	81,0	78,0	7,4	10,0	6,0	......	......	3,068	N E	N E	N	Cloudy	Cloudy	Haze.
5	30,220	,116	,182	79,1	80,0	76,0	9,6	10,0	5,0	......	......	......	N E	N E	N	Haze	Cloudy	Flying clouds.
6	30,210	,100	,180	78,2	80,0	77,8	9,0	9,0	4,8	......	......	......	N W	N N E	Calm	Cloudy	Fl. cl.	Haze.
7	30,180	,092	,142	79,1	82,5	78,2	5,8	10,0	1,9	......	......	......	N W	N N E	N E	Clear	Clear	Flying clouds.
8	30,156	,082	,104	79,9	82,0	77,7	7,9	10,0	6,2	......	......	......	N E	N E	N W	Fl. cl.	Clear	Clear—dew.
9	30,116	,030	,112	78,5	82,0	76,2	4,5	10,0	5,2	......	......	......	N W	N N E	N	Fl. cl.	Clear	Do. do.
10	30,144	,034	,132	78,7	80,0	77,4	5,5	7,0	6,7	......	......	......	N E	N N E	N E	Cloudy	Cloudy	Do.
11	30,136	.028	,124	78,5	81,5	77,9	5,2	10,0	6,9	......	......	2,678	N	N E	N E	Fl. cl.	Clear	Do dew.
12	30,092	29,968	,044	79,0	81,4	78,3	5,0	8,4	6,9	......	......	......	N W	N N E	N E	Fl. cl.	Clear	Flying clouds, dew.
13	30,080	,970	,040	80,1	81,5	78,0	6,1	9,5	6,3	......	......	......	N	N BY E	N E	Cloudy	Haze	Clear, dew.
14	30,092	30,012	,110	81,5	80,3	78,0	9,0	7,6	6,5	......	......	......	N E	N E	N W	Clear	Cloudy	Cloudy—lightning.
15	30,184	,040	,176	81,9	82,5	79,9	6,4	7,5	3,2	......	......	......	N E	N E	N E	Th. hz.	Cloudy	Flying clouds.
16	30,172	,068	,116	81,4	80,2	79,0	1,6	8,9	6,0	......	......	......	N E	N N E	N E	Fl. cl.	Cloudy	Thick haze.
17	30,118	,024	,114	80,0	80,5	79,0	10,3	6,5	4,5	......	......	......	N E	N N E	N E	Clear	Th. hz.	Clear—dew.
18	30,142	,055	,140	78,8	81,2	77,0	5,8	2,7	7,0	......	......	3,013	N E	N N E	N E	Clear	Fl. cl.	Fl. cl. do.
19	30,176	,080	,150	79,0	81,6	77,0	9,3	3,1	7,8	......	......	......	E	N N E	N E	Clear	Fl. cl.	Clear do.
20	30,166	,072	,148	79,6	81,5	77,8	9,7	11,0	6,1	......	......	......	N N E	N N E	N E	Fl. cl.	Clear	Cloudy—few drops of rain at 9 P. M.
21	30,174	,064	,130	79,0	78.8	75,7	5,2	8,3	6,2	......	......	......	N	N N E	N E	Fl. cl.	Th. hz.	Flying clouds—dew.
22	30,132	,040	,122	78,7	80,4	77,8	6,0	9,5	8,0	......	......	......	N	NE BY E	N E	Fl. cl.	Fl. cl.	Clear do.
23	,136	,012	,090	78,4	79,6	77,9	4,4	6,6	4,9	......	......	......	N E	N E	N E	Cloudy	Clear	Do. do.
24	,128	,032	,132	81,2	82,6	78,0	6,8	8,4	4,5	......	......	......	E	N E	N E	Fl. cl.	Fl. cl.	Cloudy
25	—	—	—	—	—	—	—	—	—	......	......	2,801	—	—	—	—	—	— dew
26	,084	29,970	,068	81,0	82,2	80,0	6,5	7,5	5,5	......	......	......	E	E SE	E	Fl. cl.	Clear	Clear do.
27	,098	,977	,064	81,5	82,8	80,3	7,9	8,3	1,8	......	......	......	E	E	E	Fl. cl.	Clear	Do. do.
28	,082	,969	,052	81,0	81,5	78,9	6,8	8,5	3,9	......	......	......	E N E	E	E	Fl. cl.	Fl. cl.	Do do.
29	,066	,970	,074	80,3	81,9	78,9	6,3	8,4	5,1	......	......	......	N E	E	E	Fl. cl.	Fl. cl.	Flying clouds do.
30	,116	30,012	,126	80,8	82,8	79,7	6,6	10,1	6,7	......	......	......	E	E	E	Fl. cl.	Clear	Clear do.
31	,202	,078	,172	79,3	82,6	79,6	6,1	10,1	6,1	......	......	......	E	E	E	Fl. cl.	Clear	Flying clouds do.
Mean	30,146	30,044	30,127	80,1	81,4	78,2	7,0	8,6	5,7									

The Instruments with which the foregoing observations are made, are placed in the Western Verandah of the Honourable Company's Observatory; at about 5 feet above the surface of the ground, and 27 feet above the level of the Sea; the thermometer was made on purpose for the Observatory, and at 75° (the only point at which a comparison has been made) it was found to differ insensibly from the Royal Society's Standard; the barometer is one of two Standards which I have lately constructed, and may be depended upon to 0,0100 an inch.

T. G. Taylor,
H. C. Astronomer.

ORIGINALS of the passages translated from TELUGU POEMS *in the Essay on Telugu Literature in* NO. 25 *of the* MADRAS JOURNAL, 1839.

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1840.

Originals of the Extracts from Telugu Poems translated in Essay on Telugu Literature by C. P. Brown.

Extract from Dwipada Ramayan, Aranya Canda :— *Tale of the Golden Deer.*

బెనగొని యందంద బేర్చి శోభిల్ల
కపట సారంగమై గదియ నే'తెంచి
యుపమింప న'రుదై'న యొప్పుల నొ'ప్పి
నెమరుచు బులు మేయు నిజ వాల రుచుల
రమణమై వన మయూరముల నా'డించు
తరిగొని యొకమాటు తన కుక్షి రుచుల
పరపై'న వన మె'ల్ల పసిడి గావించు
ధరణి పై నొ'కమాటు తన పార్శ్వ రుచుల
నెరి చంద్రకాంతముల్ నీరు గావించు
కుదియించి యొకమాటు కుప్పించి దాటి
త్రిదశేం'ద్రు చాపంబు తెరగు గావించు
నొ'కమాటు చంగున ను'ప్పరం బె'గసి
ప్రకటించు న'తుల శంపాలతా తతుల
మృగ యూథముల గూడి మెలగుచు నుం'డు
మృగముల బెదరించు నెల్లనె డాగు
న'ంతంత బొడ జూపు న'ట చేర వచ్చు
న'ంతలో బెదరి బిట్టు'దరి కుప్పించు
తరుల నీడల కే'గు తగ పర్ణశాల
చొరబారు న'ంతనే సృక్కి కేళ్లురుకు
వసుధ మూర్కొని జూచు వాలము'ల్లార్చు

దెసలకు చెవి జేర్చు దెలియ నాలించు
కంచుమించై పారు క్రమ్మర జేరు
కుంచితాకృతి చెవి కొన గదలించు
పచ్చిక పట్టున పవళించు లేచు
మచ్చిక నచ్చోటి మౌనుల జేరు
ఖురముల జెవి గ్రోకు కొమ్ముల తుదల
విరుల తీగె గదల్చు విరులెల్ల రాల్చు
నొందంద యందమై యా పర్ణశాల
ముందర మృగమిట్లు మోదింపు చుండ
నావేళ సీతయు యలరుల జిదుమ
లావణ్య సీమ యల్లన పర్ణశాల
మంజుల సింజినీ మంజీర రవము
రంజిల్ల వెడలి సౌరభముల బొదలు
పొదలు డాయుచు విరుల్ పొసగ గోయుచును
మదికి విస్మయమైన మాయంపు లేడి
కనుగొని వైదేహి కడు చోద్యమంది
యినకులాధిపు బిల్చి యిట్లని బలికె
నీపొంత వింతయై యిది యొక్క మృగము
చూపుల కింపార సొంపు గన్పింప
నేపార నున్నది యేమి సోద్యంబొ
భూపాల జూచితే పొదలుచున్నదియు
యెన్నడు పొడగాన మిన్ని చందముల
వన్నెల మృగముల వనభూము లందు
జగతీశ యీ మృగ చర్మంబు నందు
దగిలి సుఖింప నెంతయు వేడ్క బుట్టె
దిననాథ కులనాథ దీని వేగ దగిలి
చని యేసి వెస దీని చర్మంబు దెమ్ము
యది యేల నీ యుపాయంబున దీని
జెదరక పట్టి తెచ్చితి వేని మిగుల

మంచిది ప్రాణేశ మన వన వాస
మెంచంగ నీడేరె నీపైడి మృగము
బురికి వేగమె గొని పోయి యత్తలకు
భరతాదులకు వేడ్క బరపగ వచ్చు
నని సీత ప్రీతిమై నాడు వాక్యములు
విని లక్ష్మణుడు రామవిభు జూచి పలికె
మృగమున కిటువంటి మేనొర్వ గలదె
మృగ మాత్రమున కిట్టి మెళుకువ గలదె
మాయా మృగము దీని మది నమ్మ వలదు
మాయావు లసురుల మాయగా నొప్పు
నధియు గాకించటి సంయములు మారీచు
డధముడై మాయావియై యుండు మెలగు
నని బల్క వినమె యా యసుర గాబోలు
మనల భ్రమింప నీమాడ్కి నేతెంచె
చిత్తంబు దీని పై జేరిచి మీరు
నుత్తల పడి పట్టు నూహింప వలదు
అరయ నీవైదేహి యతి ముగ్ధ గాక
మీరును ముగ్ధలే మేదినీ నాథ
యనిన రాముడు సీత యాననాంబుజము
గనుగొని నవ్వి లక్ష్మణు జూచి పలికె
చలియింప నేటికి సౌమిత్రి యింత
యిల రాక్షసుల మాయ లెదురునే నన్ను
మృగమైన గొనివత్తు మేటి రక్కసుల
తెగ నేసి పొరిబుత్తు దెలసి యీ రెంటి
తెంపుమై లక్ష్మణ దీని వెంటాదగిలి
చంపి చర్మము దెచ్చి జానకి కిత్తు
నిన్నినాళ్లకు శలవీకోర్కె వేడె
చిన్నబుత్తునె సీత జెప్పిన మాట

హిత మతివై పూని యీ పర్ణశాల
న'తివ నే'మరకు మీ'వ'ని యప్పగించి
యల్లన రఘురాము డ'నుజు చే సు'న్న
విల్ల'ంది మోపెట్టి వెరవొ'ప్ప వెడలి
యాగ మృగంబు మున్న'ర్థి వెన్కొనిన
యా గజా'సుర వైరి యన జెన్ను మీరి
కొంకుచు పొద మరుంగున బొంచి పొంచి
గ్రుంకుచు న'ంతంత గూడ బారుచును
మగుడి జూచుటయును మరుగున నిలచి
తగులుచు దప్పంగ తమక మ'ందుచును
విల్లున'మ్ములు వెన్క వేర్చి చే పట్టి
యల్లన చరణంబు ల'వని పై ని'డుచు
చప్పడు గాకు'ండ జాడ గన్గొనుచు
చొప్పన పొ'య్యన జూచి డాగుచును
నదె చేర బట్టెద న'దె చేర వచ్చె
న'దియె లో బడియె నాక'ని చెలంగుచును
బువ్విధంబున బోవ నే'చి యా మృగము
దవ్వుల బొడచూపు దను జేర వచ్చు
పట్ట బోయిన మిట్టిపడి పారి పోవు
కట్ట'ల్క రాముని గన్న'ంత నిలుచు
లలి దెసలకు బారు లాలతో గూడ
శలవుల బులు రాల్చు చేష్టలు మరచు
నె'సగి వీక్షించి పెల్లె'గసి కేళ్లరుకు
వస మించ మిన్నుల పై బారు చు'ండు
కుప్పించి దాటి చంగున తీగె మెరుపు
ద్రిప్పిన గతి జిహ్వ ద్రిప్ప న'ందంద
కొరవి ద్రిప్పిన రీతి కుమ్మర సారె
తెరగున భ్రమరిగా దిర్ఘారం దిరుగు
బడలిన గతి గ్రగ్గు నజ్జ కే'వేర

వడి సాళువమ్ము కైవడి మింట బారు
న'లసి రాముడు వెరగ'ంది నిల్చుటయు
గెలకుల బొడచూపు కిసరించి తొలగు
తెగ వేయ దలప న'దృశ్యమై పోవు
మగుడి రా దలచిన మరి బ్రోల నిలుచు
కలగొన ని'భ్భంగి కాకుస్థ రాము
న'లయించి యలయించి యవలకు న'వల
గొనిపోయి పోయి యా ఘోర దుర్గముల
కనుబ్రామి యట బోవ గడగిన జూచి
మాయా మృగంబ'ని మది రాము డె'రిగి
దాయ నీవె'క్కడ దప్పి పోయెదవు
యగుపడి తె'ంచు బ్రహ్మాస్త్రంబు దొడిగి
నగములు వణక న'ర్ణవములు గలగ
జగములు బెదర దిక్చక్రంబు ల'దర
తెగగొని దృష్టి సంధించి వేయుటయు
నా'లోన నొ'రలుచు నా'రూప ముడిగి
హా లక్ష్మణా యన్చు హా సీత యనుచు
దెస ల'ద్రవగ మహా దీర్ఘ దేహమున
యసువుల నె'డబాసి యసురయై పుడమి
కూలె రాక్షస లక్ష్మి కూలె రావణుడు
గూలె లంకాపురి గూలె న'న్నట్లు
యంత మాయా మృగంబ'వని బ్రెళ్లుటయు
సంతోషమున వాని జానకీ విభుడు
కనుగొని మారీచుగా నిశ్చయించి
తన తమ్ము మాటలు దలచి మెచ్చుచును
సౌమిత్రి సీత యీ చపల రాక్షసుని
యీ మహా రవమున కె'ంత వేగెదరో
నా మెలుంగొగ నా'ర్త నాదంబు జేసె

యే మెడ నేమైరొ యెట్లున్నవారొ
యని దలఁచుచు నున్న నార్యార్త రవము
విని సీత భీతిల్లి వెసనుర్వి ద్రెళ్లి
తెలిసి దిక్కుల జూచి ధృతి దల్లడిల్లి
లలి దూలి మొగమెత్తి లక్ష్మణు జూచి
సౌమిత్రి యిది యేమి చందమో నేఁడు
రాముఁడు నిన్నార్త రవమున జీరె
ననఘ నీవాపలు కాలించి వినవొ
విన నొల్లవొ గాక విన రాదొ నీకు
నులుకవు భీతిల్ల వొక యింత గలఁగ
వలయవు శోకింప వది యేమి నీవు
నానా విధంబుల నా యంతరంగ
మూనిన వగల వెల్లులుకు చున్నదియు
యడవుల కొంటిమై యట పోయినాఁడు
తడవాయె రాఁడు యుద్ధంబున నేఁడు
కడిఁది రక్కసుల కెక్కడ జిక్కినాఁడొ
తడయక పోవయ్య ధరణీశు కడకు
నన యశ్రు పూరంబు లంతంత దొరఁగ
జనక నందనకు లక్ష్మణుఁ డిట్టు లనియె
తల్లి నీవేటికి దలఁకెదు రామ
వల్లభునకు నెందు వచ్చునే కీడు
యెఱుఁగవే నీ కూర్మి హృదయేశు మహిమ
లెఱిఁగియు వెడమాట లిట్లాడ దగునె
నివ్వటిల్లెడు వగ నిన్నింత గలఁప
నెవ్వఁడో యొక దైత్యుఁ డిటు జీరె గాక
యినకులాధిపుఁ డేఁడ నీ దైన్య మేఁడ
జనకజ నీ వేల చంచలించెదవు
తలమీఱి రఘురామ ధరణీశు దొఁకరి

దొలియక నిలుతురే ఘోర రాక్షసులు
మిడుతలు గార్చిచ్చు మీఁద గర్వించి
పడి నిల్వ నేర్చునే భస్మమే గాక
గరుడని పై మహోగ్రత మీఱ గదిసి
యురగముల్ జచ్చు గాకోపునే గెలువ
ధృత కోపమున గేసరిం జేరి కరులు
మృతి బొందు గాకెట్లు మెఱయంగ నోపు
కావున రామాజ్ఞ గడచి నిక్కడించి
పోవ జూచుట నాకు బుద్ధి గాదింక
నీకాన లోన నిన్నిట డించి పోవ
నేకీడు వచ్చునో నే బోవ వెఱతు
నలయక నా మాట లాత్మలో నమ్ము
తలకకు మనవుడు ధాత్రీ తనూజ
మొలసిన రోషాగ్ని లోఁగి మండుచుండ
నలయుచు సౌమిత్రి నటు జూచి పలికె
నీవు రాముని దెస నెరయ భక్తుడవు
నీవేల నేడింత నీచుండ వైతి
శ్రీరాముడిట నిన్ను జీరుట వినియు
దారుణ మతి పగ దాయ చందమున
నెమ్మది నున్నావు నీకిది తగునె
తమ్ముడు ప్రాజ్ఞు డుత్తము డీత డంచు
భూపతి నిను నమ్మి పోయిన పిదప
నీపాప వర్తన మేల గైకొంటి
వగు నెఱింగితి రాము డసురుల చేత
దెగుట నిక్కము గాగ దెలిసి నీవకట
ననుచిత మతి బూని యాలస్యముడిగి
నను బొంద దలచెదొ నాస బో విడిచి
కాదేని కొని పోయి కైకేయి సుతున

కాదట నొప్పింతు నని దలంచెదవొ
యేను నా దగు జీవ మీశరీరమున
బూనంగ దలచుట బుద్ధి గాదింక
దడయక పోయి గోదావరి లోన
బడి ప్రాణములు విడ్తు పల్కు లేమిటికి
నని బెడిదపు మాట లవనిజ బలుక
విని లక్ష్మణుడు చాల వేదన బొంది
రాము భేర్కొని కనన్ రంధ్రముల్ మూసి
దీమసంబున నాల్గు దిక్కులు జూచి
బలు పాపములు సీత బల్కు చున్నదియు
తెలియ వింటిరె వన దేవతలార
మీరందరును సాక్షి మేదినీ తనయ
ఘోర భాషల నన్ను గ్రూరత బలికె
నని బాష్ప లోచనుండై లక్ష్మణుండు
తన మది నిక నిల్వ తరము గాదనుచు
తల్లి యేనిదె బోయి తడయక నీదు
వల్లభు గొని వత్తు వగవకు మనుచు
పర్ణశాలకు జుట్టు బరులేడు వ్రాసి
వర్ణించి యీ బరుల్ వడి దాటకమ్మ
యెవ్వడేని బరుల్ యిటు దాటి వచ్చు
నన్వీరు వర తల లవియు నాక్షణమె
యని బల్కి యనలుని యపుడు ప్రార్థించి
వనిత నేమరకు నీవని యప్పగించి
జగతీ తనూజకు సద్భక్తి మ్రొక్కి
పొగలుచు రాము చొప్పున వోయె నంత
నాపావకుడు సీత నప్పుడు దాచి
యా పుణ్యు డొక సీత నపుడ గల్పించె
దీపింప ఘన దివ్య తేజంబు వెలుగ

నా'పణతియు ను'ండె న'ట్ల జింతిలుచు
న'త్తరి రావణుం డ'దరి దా లేచి
యుత్తలంబున చిత్త ము'లుకుచు ను'ండ
కరమున దండంబు ఘన కమండలము
ను'రు లలాటంబున నూ'ర్ధ్వ పుండ్రంబు
గొలదులై వ్రేళ్లను కుశ పవిత్రములు
బొలుపొ'ంద పే'రు'రంబున జన్నిదములు
న'రుదుగా వల చేత న'క్షు మాళికెయు
నరి బూని యున్న కాషాయ వస్త్రములు
తులసి పూసల పేర్ల దోడ ముందరికి
వలనొ'ప్ప నొ'క కొంత వ్రాలిన మొడయు
బడుగు దేహంబును పావలు జింపి
గొడుగును వెడ ముడీ గొన్న'ట్టి సిఖయు
న'లవడ గపట సన్యాసి వేషంబు
విలసిల్ల వెడవెడ వ్రే'ళ్లె'న్నిగొనుచు
కొన్ని మంత్రంబులు గొణుగుచు మునులు
దన్నె'రింగెద ర'ంచు దత్తరింపుచును
దలకొన్న ముదిమిచే తల వడకంగ
న'లయుచు సొలయుచు న'రసి జూచుచును
యంత'ంత నిలుచుచు హరి హరి యనుచు
శాంతి బొందుచు పర్ణశాలా'ంతరమున
కే'తెంచి నిలచిన న'ంత లోపలనె
సీత నె'త్తుక పోవ జేరె వీడ'నుచు
తను జూచి వన దేవతలు జగ ద్రోహి
చనుదెంచె వీడ'ని సభయులై మొదుగ
నిక్కంబ ముని వోలి నిలిచిన జూచి
గ్రక్కున వైదేహి కడు భక్తి లేచి
యక్కపటా'త్మ సన్యాసిగా దలచి

మ్రొక్కి హస్తాంబుజంబులు ముకుళించి
సౌమిత్రి వ్రాసిన చక్కని బరులు
సామరంగ గడచియు నతి భక్తి తోడ
పొలతి యభ్యాగత పూజ గావింప
గలుగుచు గైకొని కళ్యాణి జూచి
యో భామ నీవిట్టి యుగ్ర దుర్గముల
నే భంగి జరియించె దిట్లొంటి నిలిచి
రతివొ శ్రీసతివొ భారతివొ గాకున్న
క్షితి మర్త్య సతుల కీ చెలువంబు గలదె
నీ మోము నిండు వెన్నెల పిండు దెగడు
నీ మోవి కెంపు రా నిగ్గులై నెగడు
నీ మేను సౌదామినీ లత గేరు
నీ మాట సుధ తేట నీటుల మీరు
నీ వేణి జలద వేణికల బో దరుము
నీ విలాసంబు వర్ణింప నా దరమె
తరుణి నీ కౌంగిట దగిలి సుఖించు
పురుషుండు దలపోయ పురుషోత్తముండు
కామిని నీ పొందు గల వాడె పూర్ణ
కాముండు శ్రీ నిత్య కళ్యాణు డరయ
నిచ్చట నీ యున్కి కెంతయు వగపు
నచ్చెరు వయ్యెడు నబ్జాక్షి మాకు
నెలత నీవెవ్వరు నీవేల యింత
వలిగెద వీకాననము లోన నిలచి
యంతయు నెరుగింపు మనిన యా సీత
యెంతయు భక్తితో నిట్లని పలికె
వనఘాత్మ రఘురాము నతివ మా తండ్రి
జనకుండు దశరథేశ్వరుడు మా మామ
నా పేరు సీత యున్నత కీర్తి రాశి

భూపతి తమ తండ్రి బొమ్మ'న్న వెడలి
కాననంబున ను'ండ కడగి వచ్చుటయు
యేను లక్ష్మణుడు దో నే'గుదెంచితిమి
యీ యాశ్రమంబున నే'ము మువ్వురము
బాయని నియతి దాపసులమై యుండ
నొ'లసి నా ముందర నొ'క పైడి మృగము
పొలచుటయును జూచి భూనాథు తోడ
దాని చర్మము నాకు దగిలి దెమ్మ'నిన
బూని రాముడు బోయె బోయిన పిదప
హా లక్ష్మణీ యను నార్త రవంబు
శూలమై నా చెవి సోకి కాడుటయు
వ్రుగిలి లక్ష్మణు దిట్టి బొమ్మ'న్న బోయె
మగుడి రాడీ'ది యేమి మార్గమో దలప
న'ని జెప్పి ముని జూచి యనఘ నీ పేరు
వినుపింపు మిం'దే'ల విచ్చేసి త'నిన
కొంకక తన దైన కుహకత్వ ము'డిగి
లంకా'ధినాథు డా'లలన కి'ట్లనియె
వనజాక్షి విను మే'ను వనధి మధ్యమున
నే'నయు లంకా పురం బే'లెడు వాడ
రాక్షసా'ధిపుడ విశ్రవసు నందనుడ
యక్షే'శు నను జుండ యఖిల దిగ్జయుడ
రావణుం డ'ను వాడ రణము లో నె'దిరి
దేవా'సురుల నైన దెగటార్చు వాడ
వనిత నీ రూప లావణ్య సంపదలు
విని చూడ వచ్చితి వేడ్కలు నూని
నవయుచు పేద మానవు తోడ గూడి
యువిద యీ యడవుల ను'ండ నే'మిటికి
నా రాజ్య మంతయు నలినాయతాక్షి

కోరి యేలుచు నీవు కొమరు దీపింప
పొగడొందు బెంపొందు పుష్పకం బాది
యగు విమానంబుల హర్మ్యంబు లందు
సుర గరుడోరగాసుర సిద్ధ సాధ్య
వర కన్య లటు గొల్వ వర్తింతు గాక
నీ యంఘ్రి రుచులు నా నిలయ భూములకు
మాయని మణి కుట్టిమము లగు గాక
చెలువ నీ చూపుల సిరులు నా మేడ
కలువ తోరణములో గలహించు గాక
నీ మందహాసంబు నిత్యంబు నాదు
ప్రేమాంబునిధికి చంద్రిక లగు గాక
రమ్ము నా లంకాపురమ్మున కనిన
యమ్మాట విని సీత యతి భీత యగుచు
ధీర గావున వాని తృణముగా జూచు
తీరున తన కేల తృణము జూచుచును
యా నాతి శ్రీరాము నాత్మలో దలచి
దానవు జూడక తరుణి యిట్లనియె
సార పతివ్రతాచారగా యనక
పోరి నన్నిట్లాడ సుచితమే నీకు
ననిమిష యోగ్య పూర్ణాహుతి శునక
మునకు దుర్లభ మైన పోల్కి భావింప
శ్రీరామ చంద్రుని జెందిన నన్ను
కోరి కామింప నీకును నెన్ని దలలు
పొమ్ము గుట్టున నీదు పురవరంబునకు
నెమ్మది బోక దుర్నీతి యేమేని
దలచితి వేని నా ధవుడు రాఘవుడు
విలసిత శస్త్రాస్త్ర విదిత లాఘవుడు
హర చండ కోదండ హరణ వినోది

ఖర దూషణాది రాక్షస శిర శ్ఛేది
నిన్ను నీ వంశంబు నీరు గావించు
నేన్నంగ నీకు నాయినకులాగ్రణికి
నక్కకు సింహంబునకును దోమకును
ఢిక్కరికిని పయోధికి గాలువకును
పాయసంబునకును నైన తేయునకు
నేయంతరము పెద్ద లేర్పరింపుదురు
యా యంతరము గల్గు నాటుగాన నీవు
ధీయుక్తి లంకకు తిరిగి పొమ్మంక
నన విని రావణుం డాగ్రహోదగ్ర
జనితోగ్ర దృష్టిపై జానకి జూచి
యనుపమాటోపుడై యా రూప ముడిగి
తన మనో వీధి గందర్పుడు నిలువ
పది యవస్థలు దోచి భాసిల్లు పగిది
పది తలల్ మణి దీప్తి పంక్తుల నొప్ప
నా యవస్థల కోర్కు లవి యుప్మడించి
బాయని గతి నొప్ప బాహు విర్వదియు
గోన లిన్మడించి కోర్కులు పల్లవించె
నన పద్మ రుచు లైన హస్తంబు లొప్పె
లలి దోచు కోర్కె పల్లవముల పుష్ప
ములు బోలె నాయుధంబులు పొల్పు మీర
బరగు దివ్యాంబరా భరణైక కాంతు
లరుదార మదనాగ్నులై మండుచుండ
నతి భీషణాకారుడై నిల్చుటయును
ధృతి దూలి సీత భీతిల్లి మేతెంచి
బరుల కివ్వల వచ్చి బడియె మూర్ఛిల్లి
యరదంబు డిగి యప్పడు మురారి జేరి
ధరణీ తనయ జూచి తల్లిగా దలచి

యరుదైన వైకుంఠ మంతిది యనుచు
పరతత్వ చిత్తంబు పరులకు నీక
పోరి బోరి యజ్ఞాన బుద్ధి మార్గమున
పడి గాలి బడి వాలు వన లత పోలె
బడి యున్న కనుగొని పంక్తి కంధరుడు
గ్రమ్మి యశ్రువు లొల్క గాదిగ నులియ
గ్రుమ్మడి వీడగా గుచను లల్లాడ
నందంద దెగి రాల హార రత్నములు
పొందిన భయ శోకముల మేను వణక
నచ్చారు లోచన నదయుడై యెత్తి
తెచ్చి రథంబు పై తెరగొప్ప బెట్టె
దైవంబు ప్రేరేప తన పాలి మృత్యు
దేవత గొనిపోవు తెరగున బేర్చి
యమరారి గొని పోవ నాకాశ వీధి
కమల లోచను దేవి కను విచ్చి జూచి
పెదవులు దడుపుచు బిగి చన్ను దోయి
బ్రిదలిన పయ్యెద బిగియ జేర్చుచును
వేడ్క చకోరముల్ వెన్నెల గ్రక్కు
మాడ్కి తమ్ముల జారు మకరంద మనగ
నానన శశి దోచు నమృత బిందువుల
పూనికె గన్నీరు పొట పొట దొరుగ
మెలు గెత్తి కొదమ కోయిల గూసి నట్లు
పలుమారు విధి దూరి ప్రాణేశు జీరి
యలతయు కోపంబు నతి విషాదంబు
వెలవెల పాటునై విలపింప దొణగె
నో రాఘవేశ్వర యో రామచంద్ర
నీరజ హిత వంశ నీ దేవి నన్ను

ఇత్యాది - ఇత్యాది - ఇత్యాది.

Extracts form the *Tale of Saranga Dhara.*—Episode of the Fairy Fruit.

In these pages the lines of verse are divided at the rhyme. This rhyme is called yati. The second syllable of each line has a rhyme called Prasa.

కాదన తగు తొల్లి	కాలంబు నందు
వైదర్భుడను నొక	వసుధీశ్వరుండు
ధాత్రి పాలింపుచు	తనయులు లేక
చిత్ర కాంతుల రామ	చిలుకను బెంచి
గారవింపుచు ప్రొద్దు	గడపుచు సుతుని
మారుగా తగు ముద్దు	మాటల గరపి
పేరెత్తి యందరి	పిలిచి భాషించు
నీరీతి దినదిన	వద్ధిచే బొదలు
కారణంబున కొంత	కాలంబు జనిన
వారినిధి ద్వీప	వనముల నుండి
చిలకలు గుంపులై	శీఘ్రము మాసీమ
వలనొప్పు శృంగార	వనమున జేర
భూపతి నడిగి యా	పులుగుల గలసి
దీపించు శాల్మలి	ద్వీప వనాళి
విహరింప నందొక్క	వింత వృక్షంబు
మహి నొప్ప నమృతంపు	మామిడి యనగ
నాపండు గొని వృద్ధు	లారగించుటను
ప్రాపించు యావన	ప్రాయ మాక్షణమె
యది జూచి మా రాజు	కాఫలం బిచ్చి
ముదిమి బాపెద నంచు	మూతిని గరచి
యారూఢ గతి బోవ	నందొక్క పాము
కీరంబు గనుగొని	కినుక నిట్లనియె
నీపండుకై వచ్చి	యేడాది నుండి

కాపాడితిని బహు కష్టార్తి నోర్చి
యుప్పుడీ చప్పిడి నున్నాడ నాకు
తప్పించికొని పోవ ధర్మమా నీకు
నిమ్మని పలికిన నెగసి యా చిలుక
విస్మితించక రాజ సదనంబు జేరి
పుడమి భర్తకు పండు పొడగాన్పు జేసి
కడు భక్తితో దాని క్రమ మెల్ల దెలుప
సంతోషమున పొంది జనపాలు డొప్ప
డంతరంగమున భార్యకు నిట్టు లనియె
తన చేతి ఫల మహత్త్వము తెల్పి నేనె
యనుభవించితి నైన యావన తనువు
తరలాక్షి తనకు మాత్రమె గల్గు గాన
ధరణి నీమావి విత్తనము నాటింప
నది యంకురించి మహా వృక్ష మగుచు
పదపడి ఫలియించు ఫలముల నెల్ల
వడకు వారి కొసంగ వయసు వారయిన
పుడమి నాకు యశంబు పుణ్యంబు గలుగు
నని పల్కి తన భార్య యనుమతి దాని
ఘన బీజ మిల పాదు గావించి నాటి
జల సేకనమున పోషణము గావింప
మొలిచి క్రమానై వృద్ధి బొందుచు నున్న
చిలుకతో మున్ను జర్చించిన పాము
తలగక చను దెంచి తచ్చూత కుజము
క్రింద వల్మీక మీక్షించి యందుండి
ముందటి పగ దీర్ప మురియుచు నుండె
మరి కొన్ని నాళ్లకా మామిడి తరువు
విరివిగా కొమ్మల విర్రవీగుచును
విరులంది కాయల విస్తరింపంగ

పరిపక్వమై యూడి పడె నొక్క పండు
కన్న వైరము దీర్ప గాఁ గాచి యున్న
పన్నగం బప్పుడాఁ ఫలమును గరచి
గరళంబు నించి వృ క్షము బాసి పరిగ
తరగ నిజాంత రీ పమునకు జనియె
వనములోఁ గావలి వార లాఁపండు
కని కొనిపోయి భూ కాంతున కొసఁగ
సదయుఁడై యా రాజు సచివులు దాను
ముద మొంది మన కిఁది మొదటి లాభంబు
దొరికె విప్రునకు ముం దుగ సమర్పించి
తరువాత గైకొన దగు మన కనుచు
రాజు పురోహితు రప్పించి మ్రొక్కి
పూజించి యాఁపండు బుచ్చుకొమ్మనిన
విషము నిండిన పండు విప్రుఁడు గుడిచి
విష మెక్కి మూర్ఛిల్లి విడిచె ప్రాణముల
బహు జనం బిది యేమి పాప మో యనగ
మహనియ్యుఁ డగు విప్రు మరణంబు జూచి
యధిపతి యా బ్రహ్మ హత్యకు వెరచి
విధిని దూరుచు ఘోర విషమున చిలుక
తను జంప నూహించె దైవ యోగమున
తన చావు దప్పి పా తకము సిద్ధించె
నిఁది కీర మనఁగ రా దిప్పుడే దీని
కదలంగ నీఁక నే ఖండింతు ననుచు
చలమున రత్నపం జరము దెప్పించి
బలు తామసంబున పండ్లెల్ల గీటి
మెరుకు పక్షుల వధి యించు చందమున
కరకరి తన వామ కరమున బట్టి
పాప పుణ్యంబుల పరికింప లేక

వాపోవగా జంపె   వసుధీశ్వరుండు
వినుమంత తత్పురి   వేశ్యా వధూటి
జనములో మిన్నయై   సంగీత నాట్య
చాతుర్యముల వయ   స్సమయంబు నందు
ఖ్యాతిచే సకల భో   గముల నింపొంది
ముదిసి వేశ్యా మాత   ముగ్ధల తోడ
నదయత కలహింప   నందరు మీద
బడి వెక్కసము లాడి   ప్రహరించి యిల్లు
వెడలింప పొరిగింట   విలపింప దొణగె
సుడువులనే నేను   నూట పదారు
గడియించు యౌవన   కాలంబు నందు
బోదుగా జనముల   పొగడిన సొల్ల
కాదు కాదనిపించె   గా దైవ మాయ
పొంగుచు మరి మల్లె   పూ లమ్మి నట్టి
యంగటనే కట్టె   లమ్మిన యట్లు
వగ మాలి బ్రతికి యా   వరి నుద్ధరింతు
తగదింక జీవింప   తనకని మతిని
భావింప విష చూత   ఫలము భక్షించి
వేవేగ బ్రాణంబు   విడిచెద నంచు
నరసి నెమ్మది నెంచి   యర్ధ రాత్రమున
గరళ చూతము జేర   గా నేగి క్రింద
రాలిన ఫలముల   రాసుల లోన
మేలైన దొక పండు   మెసవిన యపుడె
వనిత పండ్రెండేండ్ల   వయసు బ్రాపింప
తన మది నుప్పొంగి   తపనోదయమున
నాడుచు బాడుచు   నచ్చోటు బాసి
వేడుకతో పుర   వీధి కేతేర
జను లెల్ల జూచి యా   శ్చర్యంబు నొంది

జనపతి కె'రుగింప సంశయం బ'నుచు
రావించి యావన ప్రాయంబు గనిన
యా వేశ్య నీ'క్షించి యచ్ఛతంబ'నుచు
పనుల వారల చేత పండ్లు దెప్పించి
జనులు చూడగ తన సచివుల కి'చ్చె
న'వి బుచ్చుకొని వార ల'ంద ర'చ్చోట
నవ మోహ నా'ంగులై నటియించి ర'పుడు
శత వృద్ధు ల'గువారు సతి పతుల్ మెసవి
యతి విస్మయత యావ నా'ంగులై యలరె
చిలుక జేసిన మేలు క్షితిపతి మదిని
దలపోసి తన జాడ్య తకు రోసి కన్న
కొడుకు మారుగ బెంచి కుడిచి కూర్చుండి
తడయక ధర్మంబు తప్పి కీరంబు
కసరి జంపితి న'ంచు కంధరం బ'ప్ప
డ'సిధార దెగ వైచి ప్రాణముల్ విడిచె
తన భర్త యీ రీతి తనువు వీడుటయు
గని రాజ సతి యను గమనంబు జేసె
చిలుక సామ్యంబుగా జేయకు మి'పుడు
వలదు నీ పుత్రుని వధ్యుని జేయ

ఇత్యాది - ఇత్యాది - ఇత్యాది.

Extracts from the Lila, Canto III. The Birth and youth of Maia.

శ్రీ సిద్ధపీఠ   దేశిక చక్రవర్తి
భాసుర పద పద్మ   భజనాభిరతులు
సత్య శౌచ దయాది   సద్గుణాన్వితులు
నిత్య నిర్మల కృత్య   నియమాభిరతులు
ముక్తి గోరెడు భవ   మోహ వర్జితులు
భక్తులాలింపు డీ   ప్రభులింగలీల
హాసు డిట్లనుగమింప   నమరోరగములు
పరిణామ వార్తలు   బచరింపుచుండ
తగిన శైలమునకు   దక్షిణంబందు
తగు బెళువళి సీమ   తనరారు నందు
సకల జనంబులు   సత్య భాషణులు
సకలేశు భక్తులు   సకల మానవులు
ధర్మ మార్గస్థులు   ధరణీశు లెల్ల
నిర్మల చిత్తులు   నిఖిలార్యు లెల్ల
ధర్మంబు నాల్గు పా   దంబుల నడుచు
దుర్మార్గు లచ్చట   ద్రొక్క రెన్నడును
యా దేశ మధ్యంబు   నందు చందురుని
మేదుర కళ లెల్ల   మిళితమై యుండు
సదనమో కాక వి   శ్వంభరా రమణి
వదనమో యన   బణవని యను పురము
చాల నొప్పారు   నచ్చటి విశేషముల
నాళీకభవుడు వ   ర్ణన సేయ లేడు
పూచిన మావులు   శోక మూకులును

కాచిన నిమ్మలు   కదళికా తరులు
పండిన పనసలు   ఫల పూగములును
మండితాశోకముల్   మాలూరములును
నర్జ ఖర్జూరముల్   చంపక వకుళ
భూర్జాది తరుల తో   పుల నేపు మిగిలి
కలకంఠ శుక శారి   కా కదంబములు
కలకల ధ్వనులతో   గదిసి క్రీడించు
కన్నె గేదంగులు   కరవీరములును
పొన్నలు పొగడలు   బొండుమల్లెలును
గుండవర్ధనములు   కొండగోగులును
బండిగురివెందముల్   పారిజాతములు
వాసంతికలు విర   వాదులు జాజు
లాసన్న జాజులు   నట్టి చామంతు
లేకాలమున గల్గి   యీశు భక్తులకు
నాకాంతు బొడమించు   నభవు బూజింప
పరువు దప్పక పూచి   పరిమళింపుచును
పురము చుట్టును నుండు   పుష్ప వాటికలు
కస్తూరి నలికిన   ఘన వితర్దికలు
విస్తారములు గల   వివిధ వీధులును
మకర తోరణములు   మణి తోరణములు
నొకనాడు విడువక   నుండు నప్పురిని
కలయంపి చల్లిన   గంధంబు నీటి
చలువ నెత్తావు ల   చ్చట హెచ్చి యుండు
మలయజామోదంబు   మచ్చిక దాల్చి
యలరుల నెత్తావు   లంగీకరించి
చల్లగా గొలకుల   జాడలు పట్టి
మెల్ల మెల్లన వచ్చి   మానలోచనల
యుల్లంబు ఝల్లన   నొరసుచు పైట

లల్లన వొలగించి   యలక లల్లార్చి
వొల్ల తావులు ముట్టి   యింపు పుట్టించి
పల్లవ లీలనా   పట్టణం బందు
సల్లలితోత్సాహ   సంపద మెరసి
మల్లడి గొనుచుండు   మలయ మారుతము
వేద శాస్త్రాగమ   విద్యల యందు
బాదరాయణు క్రిందు   బరచు విప్రులును
ప్రజల బాధింపక   బరుల సాధించి
విజయంబు చేకొను   విపులార్థి పతులు
లెక్కతో బ్రతుకుటే   లెక్కని ధనదు
పెక్కువ మెచ్చని   బేహారి కులును
విక్రమార్జుని మీద   విడిచిన నైన
నాక్రమింపగ రాన   రందున్న భటులు
సొగసిన మరు నైన   సోక పూట లోన
సొరపుగా వలపింప   నేర్తు రంగనలు
యిభ హయంబుల నేగ   మెన్నిక చేవ
విభు గజాశ్వము లైన   వెలవెల బారు
అనువాడ నేరని   యర్థి లేదందు
విని యూరకుండెడి   వితరణి లేదు
పతి భక్తి నడపని   భామ లేదందు
సతుల రక్షింపని   జాల్ములు లేరు
ఆ కోట పొడువును   నగడిత లోతు
నాకులుం గూర్మ ప   న్నగులును గాని
మెరు లెరుంగ రనంగ   సురుతర సౌధ
సరణి యుచ్ఛేధంబు   జర్చింప దరమె
కరి బృంహితంబులు   ఘంటారవముల
వర వంది మాగధ   వాగ్విలాసముల
ఘోషిత స్వనములు   నెల్ల వాద్యముల

ఘోషణంబుల బ్రజా   కోలాహలముల
రమణీయ్య మగు న   ప్పురం బేలు చుండు
మమకారు డనియెడు   మండలేశ్వరుడు
యతని సౌభాగ్య మే   మని జెప్ప వచ్చు
రతిరాజు రూపున   రమ్య భోగమున
సురరాజు కలిమి భా   సుర రాజరాజు
కురురాజు మాన న   ద్గుణమున నీగి
ధర నంగరాజని   దను బ్రస్తుతింప
గరిమెతో నారాజ   కంఠీరవుండు
శాత హేతి నికృంత   శత్రు రాజన్య
జాత నిర్భిన్న భా   స్వన్మండలుండు
మనుచుండి తన మేన   మామ సత్పుత్రి
ననుప మాంబుజ నేత్రి   యంచిత గాత్రి
మోహిని యను జగ   న్మోహిని దగ వి
వాహమై యత్యంత   వైభవంబులను
శచియు నింద్రుడొ రమా శార్ఙ్గిలా శీత
రుచియు రోహిణియొ   మరుండును రతియొ
యన దగి కవ గూడి   యనగి పెనంగి
మనసులు సరిబోయి   మగతలం జిక్కి
కామ తంత్రంబులు   గడుపుచు నుండు
రామమకారున   కా మోహినికిని
సంతాన లాభంబు   సమకూర కున్న
నింతియు విభుడును   నెంతయు వగచి
యీ రాజ్య సుఖ మేల   యీ రాజ్య మేల
గారాపు సంతతి   గలుగమి మనకు
స్థిర నపుత్రస్య గ   తిర్నాస్తి యనుచు
వర వేద వాక్యముల్   వాక్రుచ్చు చుండు
నని శకునజ్ఞుల   బొడగుడు రట్టి

సోనరంగ పోచిళ్ల   బోతురు మరియు
గద్దె చూపింతురు   గౌరి నోముదురు
పెద్దలు తమకు జె   ప్పిన ప్రకారమున
గల నోము లన్నియు   గలయ నోముదురు
పలు దెరంగుల సొమ్ము   బార జల్లుదురు
క్షుద్ర శక్తుల నెల్ల   గొలుతురు గాని
రుద్రు గొల్వంగ నే   రుగ రజ్ఞు లగుచు
అటు గొన్ని దినముల   కాదంపతులకు
కుటిల కుంతలి మాయ   కూతురై పుట్టె
పుట్టిన దినమున   భూరి వాద్యములు
నెట్టన మ్రోసె నె   న్నని విధములను
భూరి వెట్టించిరి   భూసురులకును
ధార పోయించిరి   ధరణీ స్థలములు
అర్థి సంఘముల కి   ష్టార్థ సిద్ధులను
అర్థి నిచ్చిరి జను   లచ్చెరు వొంద
నూరును యిల్లును   నెల్లక విడిచి
ఘోర కాననముల   కును జని యచట
గంగా తటంబుల   ఘన గిరి గుహల
శృంగార వనముల   సిద్ధ స్థలముల
పంచాగ్ని మధ్యమ   భాగంబు లందు
మంచు లోపల జల   మధ్యంబు నందు
ఫలముల జలముల   బండుటాకులను
మలయు నాకటి చిచ్చు   మానుపు కొనుచు
వాయక నిష్ఠత   పంబు లేప్రొద్దు
జేయు తపస్వుల   చిత్తముల్ జెదరి
తలలు వణకెడు ముది   తాపసోత్తముల
తలపు నెంతయును త   త్తర కత్తరయ్యె
మృగ పక్షి పశువులు   మేతలు వదిలి

పగలు రేయును వెంట బడి బాయ వ'య్యె
పుట్టలు తల మీద బుట్టి న'ప్పుడును
నెట్టన నిష్ఠలు నిలిపెడు ఋషుల
గుట్టు ల'న్నియును గూం కుచు వత్తు ల'య్యె
ని'ట్టి దుర్దశ రాక కే'మి కారణము
యనుచు చింతా'క్రాంతు లగుచు న'ందరును
మనసుల దలపోసి మరుగుచు నుండ
దుర్వార దుర్భావ దుఃఖా'గ్ని వజ్రి
దూర్వాసు డా'మహా త్ముడు శైవ మౌని
వచ్చె న'చ్చటికి దై వ వశంబు కతన
వచ్చిన గని ముని వ్రాత మా'తనికి
న'ర్చన లి'చ్చి మ హో'హర్ష పీఠమున
గూర్చుండ జేసిమ క్షువ జేరి మ్రొక్కి
కరములు శిరమున గదియించి దేవ

హర కృపా'యత్త కా లా'ర్ధా'నుభావ
యేమి గారణమున నీ'చిత్త చలన
మీ'మార్గి మాక'య్యె నె'రుగింపు డ'నిన
ధాత్రి పై మమకార ధరణీ'శ్వరునకు
పుత్రియై మాయ య ద్భుతముగా బుట్టె
నె'క్కడి యోగంబు నె'క్కడి తపము
లె'క్కడి భక్తి ము రె'క్కడి ముక్తి
యన విని దూర్వాసు న'డిగిరి మరియు
మనములు చలియింప మాను ల'ందరును
మాయ యెట్టిది యది మహి నే'ల పుట్టె
నీ'యర్థమును మాకు నె'రుగింపు డ'నిన
దంత కాంతులు దిశా దంతి దంతముల
కాంతులు కడకొ'త్త గా బల్కి మరియు
హరుని కొల్వున గౌరి యందరు వినగ

ధర నిజ సుఖమున   దనరె నె'వ్వండు
నా కా'నతి'ండ'న్న   నగజతో శంభు
డా'కొల్వులో వార   ల'ందరు వినగ
న'ల్లమప్రభువు పో   యని యానతి'య్యో
మెల్లన నవ్వి య   హ్మౌలత నా మాయ
క'క్కజం బ'ందుచు   న'ల్లమప్రభువు
చిక్క కు'న్నపుడుగా   చెల్లు నీ మాట
యని తన తామసం   బ'ంతయు గూర్చి
వనితగా జేసి భూ   వలయ స్థలమున
త'నిచె న'ల్లమ గెల్వ   న'ది వమకార
జనపాల పుత్రియై   జనియించె దాని
కల గుణంబులు జెప్ప   కథలుమై యుండు
దెలిపెద నొ'క కొన్ని   తెరగొ'ప్ప వినుడు
గరుడ కిన్నర యక్ష   గంధర్వ వరుల
నర సురా'సుర సాధ్య   నాగ ముఖ్యులను
కోమలులకు బారి   గొరియల జేసి
దామెన కట్లకు   దార్చు నా'మాయ
పొంగి చతుర్దశ   భువన పంక్తులను
మ్రింగుచు ను'మియుచు   మెరయు నా'మాయ
పరమేష్ఠి దొర యని   బరికింప మాయ
వర వాణికిని జిహ్వ   వాసంబు జేసె
హరి యధికుండ'ని   యరయంగ మాయ
యురమున ని'ందిర   ను'ండంగ జేసె
రుద్రుండు ఘను డ'ని   రూపింప మాయ
రుద్రాణి నర మేన   రూఢిగా నిలిపె
ఓరి కన్నను ఘనుల్   వెదకిన గలరె
యేరికి గెల్వ రా   దీ'మహా మాయ
చూచి మరపు మాయ   సుద్దు ల'న్నియును

బూచి విధంబున బోలియు దన్నె'రుగ
దల్లియై తనయయై తరుణియై మాయ
యెల్ల వారల భ్రమ యింపుచు ను'ండు
పరికింప నా'మాయ బాయు డెందముల
బోరి న'ల్లమప్రభు బూని చింతించు
డ'ని చెప్పి మార్వాసు డ'రిగె నిజే'చ్ఛ
మును లె'ట్ల సేయుచు ముదమున ను'ండి
రి'ట మమకారుడు ని'ంతి మోహినియు
పటుతర ప్రేమనా' బాలికై మాయ
గను విచ్చి మాతుర గను మాయ లేక
మనసున దలతురు మరువరా' రూపు
న'క్కున జేర్పుదు ర'డలంగసీ'రు
పక్కలో ని'డుదురు బాసి పోలేరు
మాయ గాకి'ది యేడ మన బిడ్డ యనుచు
మాయ పేరి'డియె న'మ్మమకార నృపతి
దాదులు జన్ని'చ్చి దల యంటి జలక
మా'దరంబున నా'ర్చి యట తడి యొత్తి
తొడల పై ని'డి వెన్న తో ను'గ్గుబెట్టి
కడు నొప్పు గన్నుల కాటుక బెట్టి
భూతి బొ'ట్టి'డి చల్వ పొత్తులు బరచి
ప్రీతి బండగ జేసి బెద్ద యెల్గునను
జోకొట్టి జోకొట్టి జోల బాడుదురు
ప్రాకటంబుగ నిద్ర బట్టిన'ందాక
యంచిత రత్న మ యంబై'న తొ'ట్ల
మంచంబులో దోచు మానిత ఛాయ
తన తోటి బాలగా దలచి బట్టంగ
జను లీల చేతులు జాపుచు నా'డు
తల్లి చంకిట ను'ండి తండ్రి జంకకును

మెల్లనె జని తండ్రి మెడ గౌఁగలించి
గద్దరితనమున కడు వేడ్క తోడ
ముద్దులు బెట్టుచు మురియుచు నాడు
అందెలు మువ్వలు నంఘ్రుల మొరయ
నందంద గదలి దట్టడుగులు బెట్టు
సంగతంబులు బయి డొత్తులు నదుట
రంగైన బంగారు రావిరేకయును
యందంబుగా గన్నె రాకు దండలును
కుందనంబున నైన గుంట్ల పేరులును
మేన నొప్పారంగ మిక్కిలి వేడ్క
తో నాడుబడుచుల తో గూడి యాడు
తన తల్లి తండ్రులు దాదులు చెలులు
మనసు రంజిల్ల యా మాయ బాల్యంబు
గడుపుచు నుండె నక్కజ మొంది జనులు
వేడుక నెయి సొల్ల వినుతింపు చుండ
నామీద మాయ శి ఖాచార్య నట్ల
సామజంబులకు హం సలకును నడలు
కలకంఠ తతులకు కలకల ధ్వనులు
చిలకలకును ముద్దు బలుకు పల్కులును
దానేర్పు చుండునం తట యావనంబు
గానంగ నయ్యె నా కందువ మాయ
మనసులో భావంబు మాటలో తేట
తను సన్న మధ్యంబు కర సౌంజ్ఞ కీలు
శౌమముడి కోపంబు బుద్ధి బింకంబు
భ్రమకు గారణ మైన భావంబు జూచి
మూర్ఖు లైనను జూచి మోహింపు చుండ
ప్రౌఢ తనంబున బరగుచు నుండె
నానటనంబులు నావిలాసములు

నానడలాపిక్క లానును దొడలు
నానితంబము గౌను నాగబ్బి గుబ్బ
లానాసికము పోగ లైనట్టి కన్ను
లానయం బాగు చేతు లానగు మోము
నానెరి వేణియు నామాయ మగుట
కే కాని యెవ్వరి కిని లేవు పిదప
లోక త్రయంబును లోగొన్న యట్టి
యా మాయ కుండంగ నానృపాలుండు
హేమ రత్నములతో నేవు దీపింప
గోడలు బెట్టించి కొలువు కూటములు
మేడలు వాడలు మేలు దూళిగెలు
కట్టించి యందు న కల నియోగముల
బెట్టించి విద్యల పెద్ద లైనట్టి
ఘనులచే జెప్పించె కావ్య నాటకము
లనుపమంబుగ బాల నట్లు రప్పించె
నట మీద మమకారు డాత్మ సంభవకు
పటు వైభవంబున పరిణయంబునకు
కరహాట మరహాట కర్నాట లాట
కురు భోజ బర్బర ఘూర్జర ద్రవిళ
నేపాళ మాళవ నిషధ సౌవీర
భూపాల సుతుల నా పుత్రి మాయకును
గరిగరి కల విద్య కౌశలంబునను
దొరసిన దొర యాడ దొరకునో యనుచు

Extract from Canto VIII. describing the death of Maia.

యా రీతి నల్లము డంతర్ధి నొంద
భూరి శోకంబున బొగలుచు మాయ
సఖుల నాలోకించి ఖిన్నయై యుకను

హిమశైల సుత కడ కేనెట్లు వత్తు
నామేనకాత్మజ హరు గొల్వనకును
నేమాడ్కి బోవు నే నిట్లయ్యెకొంటి
యింత కార్యమునకు యిందరి లోన
పంతమాడితి గదా బాపురే విధియు
అని యాత్మ లోపల నడలుచుండంగ
మనుజ నాయకుడు కు మార్తె జూడంగ
వనమున కేతెంచి వనమెల్ల దిరిగి
కనియె నొక్కెడ చెలి కత్తెల గూడి
అఖిల చింతాక్రాంత యై యున్న సుతను
సతియును బతియును సయ్యన జేతు
లెత్తి కౌంగిట జేర్చి యింతి నీకింత
చిత్త విభ్రమణంబు జేసెగా శివుడు
మన్నెరాయ కుమార మండలేశ్వరుడు
నిన్నడిగించంగ నీవు నేడొక్క
మద్దెలకాని వెం బడి బారి వచ్చి
యిద్దర వస్థకు నెట్లు లోనైతి
వద్దమ రేయి నీ యమ్మ నీకెన్ని
బుద్ధులు జెప్పిన ప్పుడు విన వైతి
మన్నె రాజుల కెల్ల మగడ నయ్యెడు
నన్నైన దలచక నా ముద్దు కూన
దిప్పకాయవు వలె తిరిగి యిల్ వరస
తప్పంగ నడుతురా తల్లియు దండ్రి
జెప్పిన మాటలు సేయకుండుదురె
తప్పె కార్యము గతో దక బంధమునకు
పని యేమి యున్నది పల్లకి యెక్కి
చను దెమ్ము లెమ్మన్న జననాథు జూచి
విమల వాక్ప్రౌఢిని విస్పష్టముగను

హిమశైల తనయ నే   నీక్షణంబున నె
భ్రమయించి వలపించి   పట్టుక వత్తు
నని శివు ముందర   నగజతో నాడి
చనుదెంచె యా ప్రతి   జ్ఞయు చెల్లదాయె
కైలాసమున కేము   గదలి పోయెదము
చాలింపు డీక మీ ని   షాదముల్ మీరు
ప్రోలికి జని సుఖం   బున నుండు మనుచు
విమలయు మాయయు   వినువీధి జనిరి
భ్రమదయు బతియును   బహుళ దుఃఖముల
నడలుచు బడలుచు   హా పుత్రి యనుచు
పుడమి ధరాళి నొడల్ల   బ్రుంగుడు గాగ
బొరలుచు నొరలుచు   బోయితే యనుచు
కరుగుచు మరుగుచు   కటకటా యనుచు
కందుచు గుందుచు   కళవళింపుచును
వందుచు వెనరుచు   వడి గొట్టుకొనుచు
నాయంద మాచంద   మావిలాసములు
నా యక్క మేమొన్ని   నాళ్లకు మరుతు
మనుచు ప్రలాపించు   నవసరంబునను
ఘనుడహంకారుడ   క్కడికేగుదెంచి
కడ చన్న పనికి దుః   ఖపడంగ నేల
మృడు నాజ్ఞ జనులకు   మీరంగ దరమె
మాయ కారణమున   మన యింట నిలచి
పోయె నింతే కాక   పుత్రియే మీకు
విమల చెప్పిన మాట   వినియును నిట్లు
క్రమము దప్పంగ దుః   ఖపడంగ దగునె
మన రాజధానికి   మగుడి పోకున్న
నను మానములు పుట్టు   నరుల డెందముల
మన వార లందరు   మన తావు విడిచి

చన జాతు ర'న్య రా జన్యుల కడకు
యని నొడబడ జెప్పి యా మమకార
జనపతి దెచ్చి యా స్థానంబు న'ందు
నిలుప నా'మమకార నృప కుంజరుండు
సలలిత లీల రా జ్యము సేయు చు'ండె
అక్కడ నా'హాయ యా విమలయును
మ్రొక్కి శంకరు రాణి ముందర నిలచి
తల వ్రేల వేసుక ధరణి వ్రాయుచును
నిలుచు'ండ గని భవా నియును న'హ్మాయ
క'ల్లమ చిక్కక యరుగుట యెరిగి
ఫుల్లాసము'డిగి ని ట్టూర్పు నించుచును
హరుని వద్దికి బోక యద్రిజ యుండె
హరుడు నా'వృత్తాంత మ'ంతయు నె'రిగి
గిరిరాజ సుత యింటి కిని తానె పోయి
కరుణా రసంబు దొలు కంగ నూ'రార్చి
యంతట జాలింప క'ంత కా'ంతకుడు
కాంతకి'ట్లనియె వ్యం గ్యము గాన బడగ
పిడుగు తండములను . పిట్టల జేసి
పుడక బెట్టగ వచ్చు ను'గ్రో'రగముల
బొడుగంగ వచ్చు మృ త్యువ వాడి కోర
లూ'డిసి పీకగ వచ్చు సు'ర్వన'ల్లమును
గరిగింప రాదె'ట్టి ఘనులకు నై'న
తరుణి యంతే దాని ధైర్య మ'దె'ంత
అయిన కార్యంబ'య్యె యద్రిజ నీదు
మానసంబున చింత మరువుమీ యవిన
హాయ నా హరుగా మహికి బంపినను
యా యల్లముకు బ్రతి న్యై నీవు బోయి
ఆడిన పంతంబు హావణించు కొంటి

ప్రౌఢిత నీకన్నైన నూరక యుండుము
మన విని పార్వతి యధిక గర్వమున
తనివోని నీ లోని తామసం బెల్ల
వనితగా జేసి య వ్వసుధకు బంపి
నిను నీవె జేసుకొం టివి నగుబాటు
ఘన సహజానంద కలితుని నతని
మనుజ మాత్రునిగాను మది దలపోసి
మాయయు గీయయు మాటాడ గలదె
కాయ గుణంబులు గలవె యాతనికి
యని సారె సారెకు హరు డిట్లు పలుక
విని విని వేసారి విభున కిట్లనియె
అక్కటా పలుమారు నామాట లేల
ముక్కు గోయుట గాక ముకరమి నేల
నేరమి యెంచంగ నేనెంత దాన
కారుణ్య నిధి నీవు గావున నన్ను
మన్నింపు మనిన న మ్మానిని జూచి
పన్నగా నిట్లని పలికె నీశ్వరుడు
యేవిధంబున నైన యీసారి కోర్వ
నీ వగ పెల్లను నేనె దీర్చెదను
నా విని దండ ప్ర ణామంబు జేసి
కేవల భక్తితో గిరిజ కేల్మొగిచి
యే వగ మాన్చెద వీవగ ననిన
దేవికిట్లనియె నా దేవ దేవుండు
నీ లోని సాత్విక నిర్మల కళను
భూలోకమున కను పుము కర్మ రహిత
భక్తి వైరాగ్య సం పన్నగా జేసి
భక్తి మెచ్చుట నుండు ప్రభువుండు నచట
గాన నీ సాత్విక కళ యున్న కడకు

తానె డాయగ వచ్చి తనదు నిజ స్వ
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These pages, 45 to 78 are to be placed at the end of No. 26 of the Madras Journal.

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LITERATURE AND SCIENCE.

No. 27—*April* 1840.

I.—*Catalogue of the Birds of the Peninsula of India, arranged according to the modern system of Classification; with brief Notes on their Habits and Geographical Distribution, and description of new, doubtful and imperfectly described Species:—By* T. C. Jerdon, *Assistant Surgeon, 2d Madras Light Cavalry.*

(*Continued from No.* 26 *page* 80.)

Tribe SCANSORES.

Family PSITTACIDÆ.—*Parrots.*

Sub Family MACROCERCINÆ.—*Long tailed Parrots.*

Genus PALÆORNIS.—*Ringed Parrakeet.*

200.—*P. torquatus*, Vigors.—*P. cubicularis*, Wagler.—*Ps. torquatus*, Gmel.—*P docilis*, Vieill.—Perhaps also *P. bicollaris* of the same—*Lybur Totah*, or *Totah*, H.— *Common red-ringed Parrakeet.*

This parrot is one of the most common and abundant birds in India, frequenting the cultivated ground and gardens in all parts of the country, even the most bare and open. It is very destructive to various

kinds of grain and fruit. It associates in flocks of various size, sometimes very numerous, roosting in the holes of old trees, and flying forth to their various feeding haunts, early in the morning. When the grains are cut and fruit is scarce, it often takes long flights in search of any fruit-bearing trees, skimming close to the large trees, and when successful in its search, in general not alighting suddenly, but taking a short circle, and changing its usual mode of flight, viz. a swift and continued flapping of their wings, to a steady sailing with wings spread and turned obliquely downwards, and thus alighting on the tree speedily commences its meal. Its flight is very swift, and it generally keeps up a harsh scream when in motion. It is, however, at all times a noisy bird. It breeds in holes of trees during the hot weather, laying, as I am credibly informed, 3 or 4 white eggs.

Irides light yellow; bill lively red above, dusky beneath. Length 16 to 18 inches; wing 7; tail 10 to 11.

201.—*P. Alexandri*, Vig.—*Psitt. Alexandri*, Auct.—*Raee-Totah*, H. —*Large red-ringed Parrakeet.*

This species is much more rare than the last, and I have only seen it on two or three occasions. The first time I became aware of its being found in the peninsula was seeing one carried off in an open space in the jungles of Malabar by a Shaheer *(Falco Aldrovandi)*, which dropped it on my firing at it, and I picked it up, severely wounded but still alive. I have again seen it once or twice in the neighbourhood of well wooded villages, in the northern part of the table land, and obtained 4 young ones from the nest, in a hole of a lofty tree, last December. As I am informed by shikarees that it is not very uncommon in some of the more wooded districts, I dare say I have occasionally overlooked it, mistaking it for the last; still it is comparatively so rare, that I think the previous species was most probably the one taken first to Europe from this country, and which therefore should have been named *P. Alexandri*. It breeds during the cold season.

Length about 20 inches; wing 8½; tail 12; bill deep cherry red above, lighter and more orange red beneath; feet cinerous.

202.—*P. Bengalensis*, Vigors.—*Psitt. Bengalensis*, Gmel.—*P. erythrocephalus*, Gmel.—*P. flavicollaris*, Frankl.—*Yellow collared Parakeet*, Lath. Young bird.—*Tooeeah Totah*, H.—*Red-headed ringed Parakeet.*

N° II

Palæornis Columboides

Drawn on Stone C.V. Kistnaraz

Blue winged Parrakeet

Printed by C.V. Kistnaraz

This lovely species is never found in the open country, being a denizen of open jungles, and also found in the clearer spaces of the denser jungles. I have seen it in Goomsoor; also brought from the jungles of the Tondiman's country in the Carnatic; on the west coast, not uncommon; and even occasionally in low jungly districts in the Deccan. It has the same habits as others of the genus. The *P. flavicollaris* of Franklin, or *plum-headed Parakeet* is always found in the same localities as the *red-headed Parakeet,* and is considered as the young bird by shikarees and others; so, though I have not seen the actual change, yet as the size and structure agree, I have no doubt that it is the same bird.

The three last species are frequently taken when young and caged, learning to repeat words and sentences with facility, and becoming very tame.

Irides light yellow; bill reddish yellow above, beneath blackish. Length 14; wing $5\frac{1}{4}$; tail 8 to $8\frac{1}{2}$.

203.—*P. Columboides,* Vigors.—*P. Melanorhynchus,* Sykes—young bird.—*Muddun Gowr Totah,* H.—*Blue-winged Parrakeet.*

This very elegant and chastely coloured *Parrakeet* is found only in the dense and lofty forests of Malabar, as well below the ghauts as on them, attaining, as I have observed on the sides of the Neilgherries, a height of nearly 5000 feet. Its usual call is less harsh than that of the other species. I have not yet seen it domesticated. I have shot the *P. melanoryhnchus,* always in company with the others, and consider it as the young bird. Whether the adult female retains the black bill or not, I do not know, as the specimens with red bills shot by me were all male birds.

Like the other species it feeds on fruit and berries of various kinds.

Irides light yellow; feet cinerous; bill lively red above, dusky beneath. Length 15—16 inches; wing rather more than $5\frac{1}{2}$; tail $8\frac{1}{2}$ to 9.

Sub Family LORIANÆ.—Swains.

Genus PSITTACULUS.—Khul, Selby.—*Lorikeet—Dwarf Parrot.*

204.—*Ps. vernalis,* Swains.—*Bhora* or *Bhoāra,* H.—*Red-rumped Dwarf Parrot,* or *Lorikeet.*

I am convinced that Swainson was right in separating this species

from the allied one, *P. galgulus*, for I have shot many of both sexes, and seen numerous specimens, none of which showed any approach to the plumage of the other. I have found this species only in the more open spaces of the lofty jungles of the west coast. It is most numerous, I think, in Travancore, and the more southern portions; also at the foot of the Neilgherries. I did not observe it at any considerable elevation, but I see it is enumerated in Mr. Elliot's Catalogue, as found in the Southern Mahratta Country, but only during the rains. It is found in small flocks, and while feeding keeps up a continual feeble chirping. I am informed by a gentleman who was for some time in Malacca, that either this, or an allied species (perhaps the *P. galgulus*), was often domesticated there, and that it had the same custom of sleeping with its head downwards, which the *Colies* (*Gen. Colius*) are represented to have. I found in the stomach of several birds a soft pulpy vegetable mass with a few seeds.

Irides whitish yellow; bill and legs orange. Length about 6 inches; wing rather more than $3\frac{1}{2}$; tail $1\frac{3}{4}$.

Family PICIDÆ, Swains.—*Woodpeckers.*

Sub Family PICIANÆ, Swains.—*True Woodpeckers—Lulkurphor*, H.

Genus PICUS.—*Typical Woodpeckers.*

Sub Genus PICUS, Swains.

205—*P. Strictus*, Horsf. Lin., Trans. vol. xiii.—*P. Peraluimus*, Wagler.—*P. Goensis*, Auct. (bad description).—*Scarlet-backed Woodpecker.*

This handsome *Woodpecker* is found only in the dense and lofty forests of the west coast, occasionally seen below the ghauts, but most numerous on the more elevated wooded regions, and frequently seen on the summit of the Neilgherries, in the thick woods there. Its habits do not differ from those of others of the genus. The *Scarlet-backed*

Woodpecker appears to belong to the most typical group of woodpeckers, and is the only one of that group I have yet seen from the peninsula. It is apparently a slightly aberrant species, leading to *Hemicircus* by its short neck, and short and broad tail. The female is said by Horsfield (fid. Wagler) to differ from the male in having the feathers of the head and crest orange, instead of scarlet. The only female I procured, has the whole of the head and crest of a sooty black, each feather ended with a white drop at its termination. This, however, may have been a young bird. Irides yellow; bill blackish lead colour; feet plumbeous.

Length about 12 inches; wing 6; tail 3 inches; bill to front $1\frac{5}{10}$th, straight to gape $1\frac{8}{10}$th; breadth at base above $\frac{5}{10}$ths; anterior toe (without claw) $\frac{8}{10}$ths; versatile do. 1 inch.

The tale of this woodpecker differs from that of most others of the family, in having the 4 centre feathers equally elongated, and all exposed when the tail is closed, instead of the 2 centre ones only, as is the case in most other species. The ends of all four are very much worn, so that the barbs on either side extend a fifth of an inch beyond the shaft. Its head is very broad also, and the whole body indeed is remarkably thick and robust.

Sub Genus HEMICIRCUS Swains.

206.—*H? cordatus.*—New species?—*Heart-spotted Woodpecker.*

Descr.—Male, forehead and head, interscapular region, back, and rump, shoulders, wing coverts, chin, throat, and stripe from lower mandible running below the ears, of a light whitish yellow; the feathers of the wing coverts with a black heart-shaped spot at their termination. Face, cheeks, long occipital crest, nape, scapulars, quills, upper and lower tail coverts, vent and tail, deep black. Beneath from throat to the vent, dull green. On the centre of the back is a brush of dark sap green feathers, rough and somewhat bristly, and some of them smeared with a viscid secretion. Bill bluish black, legs greenish black. Irides brownish red. Length nearly 6 inches; wing $3\frac{3}{4}$; tail $1\frac{4}{10}$ths; tarsus $\frac{7}{10}$ths; anterior external toe $\frac{5}{10}$ths; versatile toe nearly $\frac{6}{10}$ths; bill to front $\frac{6}{10}$ths, at gape $\frac{8}{10}$ths. The female differs from the male only in the forehead and head being black, the feathers tipped with very minute whitish spots. This very singular little woodpecker, which is undescribed in Wagler's Monograph of the genus, appears to belong to Swainson's sub-genus *Hemicircus*, by its

short and broad tail; short neck; large feet, and excessively long wings. Its crest is tolerably long and somewhat pointed, and when raised, from the smallness of the neck, gives a triangular appearance to the head. The body is thick and dumpy. Of what use the peculiar brush-like feathers of the back are, it would be difficult to conjecture. I have found this woodpecker in the forests of Malabar, and also seen it in the Wynaad. It is also enumerated in Mr. Elliot's Catalogue.

It is, however, a rare bird; I have temporarily named it "*Cordatus*" from the heart-shaped spots on the wing coverts.

Sub Genus DENDROCOPUS, Swains.

207.—*D. Mahrattensis.*—*P. Mahrattensis*, Auct.—*P. hæmasoma*, Wagler.—*Red-bellied Woodpecker.*

This is the most universally spread of all the peninsular species of woodpecker. I have seen it, though rarely, in the Carnatic; frequent on the wooded west coast, though not in the denser jungles; and even occasionally met with it in groves of trees in the bare Deccan. I have seen it, also, on the summit of the Neilgherries. I found it most abundant in the Wulliar jungle, in the gap of Coimbatoor.

Irides fine lake colour; bill and legs slaty. Length 7 to $7\frac{1}{2}$ inches; wing $3\frac{8}{10}$ths; tail $2\frac{1}{2}$; exterior front toe above $\frac{4}{10}$ths; versatile do. $\frac{5}{10}$ths; bill to front $\frac{8}{10}$ to $\frac{9}{10}$ths; at gape $1\frac{1}{10}$ to $1\frac{2}{10}$ths.

208.—*D. Elliotti.*—New species. ?—*Golden-headed Woodpecker.*

I extract from Mr. Elliot's notes the description of this woodpecker, never having met with it myself. I put it as a *Dendrocopus* with doubt. If new, it may be named in honour of Mr. Elliot, its discoverer.

Descr.—"above black; crest and wing coverts, bright golden; cheeks, black spot from the eye to the occiput, and another commencing from the nape, and spreading between the shoulders, white. Chin and lower cheeks white, with five black lines running down the throat, breast and belly also white, covered with longitudinal black spots; quills blackish brown with three transverse rows of round white spots; bill and feet black. Irides crimson. Lives in pairs in cocoa-nut trees, often three or four pairs on the same tree. Only seen in one locality."

209.—*D. Moluccensis.*—*Picus Moluccensis*, Lath.—*P. variegatus*, Lath. and Wagler.—*P. bicolor*, Gmel.—*P. Pygmæus*, Vigors. Proc. Zool. Soc. 1830.—*Small-spotted Woodpecker.*

This little woodpecker is found in the more open spaces of all the larger jungles, whether on the east coast as in Goomsoor, or in the Malabar coast, where it is far from being uncommon, and is even occasionally found in avenues and gardens. In Goomsoor I found it frequenting the bamboos, and its tapping on the hard branches of these trees caused a loud sound, heard to a great distance. It does not confine itself to the larger branches, hopping and climbing actively about the smaller twigs, and feeding on various small insects and larvæ.

Irides yellow, naked orbitar skin, pink colour. Length 5 inches; wing 3; tail $1\frac{1}{2}$; bill to front $\frac{5}{10}$ths; at gape nearly $\frac{7}{10}$ths.

I possess a specimen shot in the Wynaad, which differs from all other specimens of this bird, which I have seen (as well as from the colour of the bird well represented in Hardwicke's Illustrations) in the much darker colour of the head and back, which are almost black instead of a light sooty brown. It has also less white beneath, its bill appears to be somewhat larger, and its feet perhaps rather less, but it is so similar in other respects that I do not venture to separate it.

Genus MALACOLOPHUS, Swains.

Sub Genus BRACHYLOPHUS, Swains.

210.—*B. Squamatus.*—*P. Squamatus,* Vigors.—Gould's Cent. Him. Birds?—*P. dimidiatus,* of Gray and Hardwicke's Ill. I. Z? not of Temminck and Wagler.—*Scaly-bellied Woodpecker.*

Although there are some slight discrepancies between my specimens and the description and figure in Gould's Century of the *P. Squamatus,* I have little doubt but that they are identical. I have found the *scaly-bellied Woodpecker* only on the western coast in well wooded districts, from the close neighbourhood and level of the sea, to the summit of the Neilgherries, where it is tolerably abundant, both in the thick woods, and among the brushwood. It in general does not ascend high on trees, keeping to the lower branches, and I have on several occasions seen it alight on the ground. In the most perfect specimens I possess, the throat and breast are nearly entirely green, the indications of the scaly markings being faint and undecided, the belly and vent are greenish white, with the scalings of the feathers much more numerous and smaller than are represented in the plate of Gould's Century, and the spots on the tail are almost obsolete and of a greenish dusky tinge. There is also a black nuchal mark. Irides pink, surrounded by a white

circle; bill horny above, yellowish at the base and beneath; feet greenish slaty. Length nearly 12 inches; of wing $5\frac{2}{10}$ths; tail $3\frac{3}{4}$; bill to front $1\frac{2}{10}$ths; at gape $1\frac{6}{10}$ths.

In the female the head is black where it is red in the male.

211.—*B. mentalis.*—*Picus mentalis*, Temm. P. C. 384? (Griff. Cuv. p. 444).—*P. chlorolophus*, Vieill., Encyl. Meth., young bird?—*Red and Yellow-crested Woodpecker.*

The brief description in Griffith's Cuvier of the *P. mentalis* of Temminck, appears applicable to specimens I have obtained from the western coast, with the exception that the throat is *not* black.

It is a rare bird. I have only seen it on two or three occasions, solitary in thick forest jungle in Travancore and Malabar. It is also mentioned in Mr. Elliot's Catalogue. However I shall here add a brief description. Head and cheek stripe red, a short occipital crest of same colour terminated by bright yellow: plumage above bright green; beneath dull sap green; the feathers banded and spotted with white. Wings greenish, with a strong orange tinge; and the external barb of most of the quill feathers of a deep orange red, internally dusky, with white spots; tail unspotted black; bill slaty, greenish beneath; legs sap green. Irides reddish brown. Length 9—$9\frac{1}{2}$ inches; wing $4\frac{8}{10}$ths; tail $3\frac{2}{10}$ths; bill to front $\frac{8}{10}$ to $\frac{9}{10}$ths; at gape $1\frac{1}{10}$th.

One specimen, probably the female, differs in having the forehead and head green, instead of red, and wants the red cheek stripe. The *P. chlorolophus* of Vieillot is probably the young bird, or it may be the female. The colouring of this species somewhat resembles that of the *P. Nepalensis* of Gray, figured in Hardwicke's Ill. of Ind. Zool.

212.—*B. Bengalensis.*—*P. Bengalensis*, Auct.—*P. aurantius*, Auct. (bad description).—*P. nuchalis*, Wagler.—*Brach. hemipodius*, Swains.—*P. chrysonotus*, Lesson?—*Orange* and *black Woodpecker.*

This is perhaps the best known of all the peninsular species, and is found wherever there is plenty of wood or high jungle, and even in groves and gardens in the vicinity of well wooded towns, as I have seen in the Northern Circars and Carnatic. On the bare table land, I have not yet observed it, but it is tolerably plentiful on the west coast, and in the wooded regions on the summit of the ghauts. It is generally seen single or in pairs. From its extensive distribution over India, it would be advisable to change its local name, either to the structural name of Swainson, or the one lately proposed by Wagler.

Irides crimson; bill blackish; legs plumbeous. Length nearly 12 inches; wing $5\frac{1}{4}$; tail 3; bill to front $1\frac{3}{10}$ths; at gape $1\frac{6}{10}$ths.

BRITISH MUSEUM

Drawn on Transfer Paper by J. Dumphy.

Picus Hodgsonii.

Printed by W Winchester

Sub Genus HEMILOPHUS, Sw.

213.—*H. Hodgsonii.*—New species ?.—*Large white-backed Woodpecker.*

Descr.—Head, short thick crest, and stripe running from the base of the lower mandible, crimson; lower part of back, rump and middle belly white; rest of the plumage deep black; bill black; legs dark plumbeous.

Length $19\frac{1}{2}$ inches; wing 9; tail $7\frac{1}{2}$; tarsus $1\frac{1}{2}$; bill to front $2\frac{3}{10}$ths; at gape $2\frac{8}{10}$ths; width at base $\frac{1}{2}$ inch; the tail is much wedged; wing with 6th quill longest; 7th equal to the 4th.

This splendid Woodpecker, apparently undescribed, appears to approach in colour the *P. Javensis* of Horsfield, the *P. leucogaster* of Temm. and *P. pulverulentus* of the same, but differs according to their description by the accurate Wagler, as well in size, as in some markings, especially the white of the back, which the above named species want. It is second in size only to the lately discovered *Chilian* species (*P. imperialis* of Gould), being about equal to the *P. principalis* of America; and though inferior in typical attributes to the *P. Sultaneus* of Hodgson, is yet its superior in size. I have seen it but rarely in the most dense and lofty forest jungle, and being exceedingly wary, I did not procure a fresh specimen, but through the kindness of Mr. Vaughan, Circuit Judge at Tellicherry, I obtained a fine stuffed specimen. I have named it in honour of Mr. Hodgson, Resident at the Court of Nepal, whose name is too well known to require here any further encomium from me.

Sub Genus MEIGLYTES, Sw.

214.—*M. badius* ?—*P. badius*, Raffles.—*P. brachyurus*, Vieillot and Wagler.—*P. rufus* of Gray and Hardwicke, Ill. Ind. Zool. (not of Wagler and other authors).—*Bay Woodpecker.*

This curiously plumaged Woodpecker is a rare species in the peninsula. I have seen it in thick forest in the Wynaad, and also in an avenue in Malabar, in the close proximity of thick jungle. Mr. Elliot also met it in the Southern Mahratta Country, and in his notes says, "Is remarkable for the head being generally smeared, as also the scapulars and tail, probably from the gum of some tree."

Irides brown; bill blackish; legs slaty. Length about 10 inches; wing $4\frac{8}{10}$ths; tail $2\frac{8}{10}$ths; bill to front nearly $\frac{9}{10}$ths; at gape $1\frac{2}{10}$ths.

Sub Genus CHRYSONOTUS, Sw.

215.—*C. tiga.*—*P. tiga*, Horsf. and Wagler.—*C. tridactylus*, Sw.—*Crimson-backed Woodpecker.*

This very elegant Woodpecker is found in the forests of the western coast, both at a low level and as high as 5000 feet, at which height I have seen it on the Coonoor pass of the Neilgherries. The specimens shot below the ghauts are considerably smaller than those I obtained at a great elevation, which latter attained the size of *P. Shorii* of Vigors, though not differing in colour from the smaller ones.

Irides fine crimson ; bill and legs dark slaty. Length varies from 9½ to nearly 12 inches ; of one of the latter size the wing is 5½ ; tail nearly 4 ; bill to front 1 inch ; at gape 1 $\frac{4}{10}$ths ; of one 9½ inches ; the bill to front is $\frac{8}{10}$ths ; at gape 1 $\frac{1}{10}$th.

Sub Family BUCCOINÆ, Sw.

Genus BUCCO, L.—*Barbet.*

216.—*B. Indicus*, Lath.—*B. Philippennsis*, Gmel. P. E. 333.—*B. flavicollis*, Vieillot.—*B. rubricapillus*, Lath. (from Brown, Illust. pl. 14.) .—*B. luteus*, Lesson, albino variety.—*Kut-Khora*, H—also *Tambayut* i. e. *Copper-smith*, which name it receives also from some European residents.—*Red-crescented Barbet.*

The *Copper-smith* is extremely common in all parts of the country, wherever there are a sufficiency of trees, inhabiting open spaces in the jungles (never in the denser portions), groves, avenues, and gardens ; being very familiar, approaching close to houses, and sometimes perching on the house top. As far as I have observed, it does not climb like the woodpeckers, but when feeding, hops about the branches like a perching bird. Though I never detected this *Barbet* tapping like the woodpeckers, I have once or twice had good reason for supposing that it does so occasionally. The chief food of the *Copper-smith* is fruit of various kinds, sometimes insects. When not employed in feeding, it generally seats itself on the very top of a tree, and gives utterance to its monotonous call of '*took took took*' (as represented by Sykes), nodding its head at each call, first to one side and then to the other.

Irides lake red; bill black ; legs red. Length 6½ inches ; wing 3$\frac{2}{10}$ths ; tail 1½ ; tarsus $\frac{7½}{10}$ths ; bill at front nearly $\frac{7}{10}$ths ; at gape 1 inch.

217.—*B. viridis*, Gmel.—*B. zeilanicus*, Lath.—Brown, Ill. Zool. pl. 15., Le Cabezon.—*Kettorea*, Vieillot.—*B. Lathamii*, Vieillot, Encly. Meth. —*B. caniceps*, Franklin, Cat.—*Kootoomra*, H. of some shikarees.—*Kootoorga*, Mahr.—*Kootur Kakee*, Can., all named from its call.—*Brown-headed Barbet.—Jungle Barbet.*

This *Barbet* is found throughout India, only in the higher jungles, and is therefore of course most abundant on the west coast, where it is found from the level of the sea to the top of the Neilgherries, where it is more abundant than in any other locality I have visited. There is a very remarkable variation in the size of this species, the largest specimens being found on the Neilgherries, and degenerating in size, as you approach the coast. From Mr. Elliot's notes I extract the following interesting observations—" Seldom seen on the wing; but single birds heard on almost every tree, uttering their peculiar note which resembles the native (Canarese) name, being a continued *Kōoturr Kŏturrr*, or *K'turrr*. They continue to call for some minute at a time, and are heard throughout the day. On each side of the throat is a naked spot with skin wrinkled, which is probably contracted and expanded when the bird is calling." This bird does not climb like a woodpecker, and I never heard any tapping from the trees it frequents. Its most general food is fruits and berries, occasionally it eats various insects. Mr. Elliot says " one was shot picking at the flowers of a small tree."

Irides reddish brown; bill and legs pale horny brown.

Length varies from hardly 8 to 10 inches; of the largest one, the wing is 4½; tail nearly 3; tarsus $1\frac{2}{10}$ths; and bill at gape $1\frac{8}{10}$ths. In the smallest, the bill is only $1\frac{2}{10}$ths; wing 4; and tail 2½ inches.

Genus YUNX.—L.

218.—*Y. torquilla ?.—Wryneck.*

Mr. Elliot obtained a single specimen of this bird, or a nearly allied species, in the middle of the month of April, in the Southern Mahratta Country. It was seated on the ground in the bed of a dry tank. I have never seen it, and add Mr. Elliot's description for the sake of comparison.

" Above of a beautiful speckled grey, with a broad irregular dark line from the crown to the middle of the back; so dark in parts as to appear almost like black spots. Cheeks and throat pale yellowish, with narrow transverse bars, which are also continued on the chin, which has a white ground. A dark broad line runs from the eye to the ear,

and another darker, narrower, and better defined down the side of the throat. Breast and upper belly white, with small triangular black spots; wing coverts have a yellowish tinge. The quills are barred with brown and isabella. Rump and tail speckled; the former with black longitudinal streaks, the latter with 3 darker, broad bands, and partially edged with black. Bill straight, round, pointed—legs shielded, of a greenish horn colour. Irides crimson.

Length nearly 7½ inches; tongue long as in the woodpeckers."

Family CERTHIADÆ.—*Creepers.*

Sub Family SITTINÆ.—*Nuthatches.*

Genus SITTA.—L.

219.—*S. castaneoventris*, Franklin, Cat.—*Chesnut-bellied Nuthatch.* I have hitherto seen this *Nuthatch* but on one occasion, which I shot in Goomsoor, in high forest jungle. I have, however, seen specimens shot at the top of the Guzzlehutty pass, in Mysore.

Length 5¼ inches; wing 3; tail 1½; tarsus $\frac{7}{10}$ths; bill at front $\frac{6\frac{1}{2}}{10}$ths; at gape $\frac{9}{10}$ths; bill black; legs plumbeous brown.

Genus DENDROPHILA, Sw.—*Social Nuthatch.*

220.—*D. frontalis.*—*Sitta frontalis*, Sw., Zool. Ill.—*S. velata*, Temm. P. C.—*Velvet-fronted blue Nuthatch.*

This lovely little Creeper is found in great abundance in the dense woods of the Neilgherries. I have seen it, though rarely, below the ghauts, also in thick forest jungle. It hunts, in general, in small parties of five or six; is very active and restless, creeping round the horizontal branches chiefly, and seeming to prefer the under side of the branches, and also running downwards. It feeds on various small insects, which it picks off the bark, but does not tap like the common *Nuthatch.*

Irides light yellow; bill orange. Length 5 inches; wing 3; tail 1½; bill to front $\frac{4}{10}$ths; at gape $\frac{8}{10}$ths; tarsus hardly $\frac{7}{10}$ths; hind toe without claw ½ an inch.

Family CUCULIDÆ—*Cuckoos.*

Sub Family CUCULINÆ, Sw.—*Parasitic Cuckoos.*

Genus CUCULUS, L.

221.—*C. canorus*, L.—*Cuckoo* of Europe.

The European *Cuckoo*, said by Franklin to be so common in Bengal, is rarely met with south of N. lat. 20. Its well known note was frequently heard in Goomsoor. Colonel Sykes too mentions it as found, though rarely, in the Bombay Deccan, and I obtained a specimen of what, I conceive, may be the young of this bird, as far south as the Tapoor pass (N. lat. 11°), and have seen the same bird apparently once or twice in wild jungly districts on the table land. I add a brief description of my bird, as I am by no means certain that it is the same as the European *Cuckoo*.

Descr.—Above brownish cinereous, the feathers all edged with white; beneath white, transversely barred with dusky brown; bill blackish; yellow at base; legs, toes and claws yellow.

Length 14 inches; wing $8\frac{3}{4}$; tail 7; tarsus $\frac{8}{10}$ths; bill to front $\frac{7}{10}$ths; at gape 1 $\frac{2}{10}$ths. Should my bird prove to be a different species from the European *Cuckoo*, it is perhaps the *C. tenuirostris* of Lesson.

222.—*C. fugax*, Horsf.—*Bychan Cuckoo*, Lath.—*Koopuk*, H.—*Oopuk*, of some.—*Pipeeha* in Bengal from its note.—*Indian Cuckoo.*

The Indian *Cuckoo* is found all over the peninsula in the more wooded districts, not only in thick jungles but also in groves and gardens. It is very numerous in the thickly wooded western coast, and its loud, shrill crescendo notes, very similar to those of the *Koweel*, are heard in every avenue. It flies very like the *Shikra*, and it is frequently pursued by small birds, probably under that impression.

The *Koopuk* lives chiefly on fruit, especially the fig of the banian tree, occasionally, however, on caterpillars, and other soft insects. I extract the following from Mr. Elliot's notes regarding its peculiar cry: " The note is *whe-wheewa, whe-wheewa, whe-wheewa*, uttered 8 or 10 times, and sometimes oftener. The first syllables lower, gradually rising till the last become extremely loud and shrill."

The dark spots on the breast and belly of this bird, have the same character as those of the hawks, being longitudinal in the young bird, and becoming transverse with age.

Irides bright yellow; bill brown; yellowish at the base; gape, eyelids and feet, of a deep bright yellow. Length 13 inches; wing 8; tail 7 tarsus $\frac{9}{10}$ths; bill to front $\frac{8}{10}$ths; at gape 1 $\frac{2}{10}$ths.

223.—*C. Himalayanus*, Vigors. Gould's Cent. Him. Birds.—*C tenuirostris*, Gray and Hardwicke's Ill. Ind. Zool.—*Small Bay Cuckoo.*

This very elegantly marked *Cuckoo*, supposed to be confined to the Himalayan mountains, is found, though rarely, all over the peninsula, in thick forest jungle. I have observed it once or twice only, in Malabar, and in the Coonoor ghaut, but have seen specimens from Travancore, where it appears tolerably abundant, and also from the eastern range of ghauts, about the lat. of Madras. The stomach of the only specimen I shot, contained caterpillars.

Length a little more than 10 inches; wing 5; tail 5; tarsus $\frac{6}{10}$ths; bill to front $\frac{7}{10}$ths; at gape rather more than 1.

224.—*C. flavus*—Gmel., Lesson Traité p. 151?—*C. honoratus*?—*C. Sonneratii*?—*C. lugubris*, Horf.?.—*Powsya*, Mahr.—*Plaintive Cuckoo.*

Among the imperfect descriptions of authors it is often difficult to determine correctly many species, but when the changes of plumage of the bird are themselves considerable, the difficulties are greatly increased. Such is the case with regard to the bird I am now going to mention. The *Plaintive Cuckoo*, as it may be appropriately named, is an inhabitant of the western coast of the peninsula, and is found alike in thick jungle, and in the more open spaces, and even in gardens and avenues. Though I frequently heard it, I only obtained two specimens, and am indebted to Mr. Vaughan for the examination of a third. I have neither seen nor heard it in any of the other districts of the peninsula. It is found at all levels from that of the sea, to the top of the Neilgherries, about Coonoor and Kotagherry, where it is found in thick bushy ground. Like the other cuckoos it is found single or in pairs. It has a most sweet and plaintive note, which is often heard, and which sounds something like the last syllable, being *whĕ-whēw, whe-whē-ē-w*, much lengthened out, and very plaintive. I found its food to consist chiefly of caterpillars. I shall add a brief description of the three birds I have had the means of observing.

The first is entirely of a dark cinereous tint, with a strong gloss of green throughout; tail blackish, edged with rufous; quills beneath cinereous. A second specimen has the same glossy green colour above, with the exception of the rump (which is lighter cinereous without any green),

and the forehead, which also is nearly devoid of the green, chin and throat cinereous; breast darker do. banded with rufous and white; belly pale cinereous, faintly marked with pale rufous and white ; under tail coverts white ; tail black; the inner webs banded with white (except the 2 centre ones), and all tipt white.

Another specimen has the plumage above entirely cinereous, with a slight indication of the greenish gloss on the wings only. Tail as in the last, beneath pale cinereous, vent and under tail coverts white, quills with a broad white band on their internal webs.

Irides, in one specimen (the last) of a fine ruby red. In the first one of a blood red, bill blackish red beneath (at the base), also at the gape and internally; feet reddish.

Whether this bird is identical with *Cuc. flavus* of Gmel. or a different species altogether, I leave to be decided hereafter.

Length 9 inches; wing $4\frac{1}{2}$; tail $4\frac{1}{2}$; tarsus $\frac{7}{10}$ths; bill to front $\frac{6}{10}$ths; at gape $\frac{9}{10}$ths.

225.—*C. dicruroides.—Pseudornis dicruroides*, Hodgson, Journal A. Soc. of Bengal, No. 86. p. 136.—*Drongo Cuckoo, or Black fork-tailed Cuckoo.*

This most extraordinary species of *Cuckoo*, disguised so effectually in the garb of the common *King Crow* (*Dicrurus*), has been lately described and figured by Mr. Hodgson, in the Journal of the Asiatic Society of Bengal. I obtained a single specimen in the Wynaad, near Manantoddy, and never again observed it. As Mr. Hodgson's paper may not have been seen by some of the readers of this Journal, I add his description—" Black with a changeable blue or green gloss—inner wing and tail coverts, and pair of extreme tail feathers, cross-barred with white. An oblique white bar across the wings internally, and high up. Bill black. Irides hoary brown; palate red. Legs and feet blue, 10 to $10\frac{1}{2}$ inches long; bill $1\frac{1}{10}$th; tail $5\frac{1}{2}$ to $5\frac{3}{4}$; tarsus $\frac{1}{1}\frac{2}{6}$ths. Long anteal toe $\frac{1}{1}\frac{1}{6}$ths; long posteal do. $\frac{9}{10}$ths; weight $1\frac{1}{2}$ oz. Sexes alike, exclusively monticulous and a forester. Tail of 10 feathers divaricated and forked. The two extreme feathers smaller than any of the rest." Mr. Hodgson further says that " the *cuculus lugabris*, will I think, be found to have a forked-tail, and to constitute a second species of our proposed new genus."

I can only add to this, that in my specimen the legs were reddish, as in the last species, and that the wing is 5 $\frac{2}{10}$ths long. Irides also were reddish brown. I may mention that I had in my manuscript notes named this bird " *dicruroides*" or ' *dicruricaudus*,' a name which its extraor-

dinary resemblance could hardly have failed to suggest, and which I was glad to see that Mr. Hodgson had also adopted. Does this *Dr ngo Cuckoo* select the nest of the *Dicrurus* to deposit its eggs in? If so, the foster parents would hardly be undeceived even when their progeny were arrived at maturity.

Genus OXYLOPHUS, Swains.—*Crested Cuckoo.*

226.—*O. edolius.—Cuc. edolius,* Auct.—*C. afer* and *C. serratus,* Gm.—*C. melanoleucos,* Gmel.?—*Leptosomus afer,* of Franklin and Sykes' Catalogues.—*Popeya,* H.—*Black* and *white-crested Cuckoo.*

The *Popeya* is distributed over all India, but cannot be said to be a common bird any where. It is of course most numerous in the more wooded districts. I have seen it in the Carnatic, Malabar Coast, and even on the bare Deccan, in low jungle or among gardens. It hunts single or in pairs, and feeds chiefly on various soft insects, &c. On the Neilgherries I have seen it occasionally about the edges of the hills, frequenting the thick bushy ground there.

Length 13 inches; wing $5\frac{1}{2}$; tail $6\frac{1}{2}$; tarsus 1 $\frac{1}{10}$th; bill to front $\frac{8}{10}$ths; at gape 1 $\frac{1}{10}$th.

227.—*O. Coromandus.—Cuc. Coromandus,* Lath.—*Cuc. Collaris,* Vieill.

I possess but one specimen of this bird, which I obtained alive at Madras, and have never seen another of the kind.

Genus EUDYNAMYS, Vigors and Horsf.—*Thick-billed Cuckoos.*

228.—*E. orientalis.—C. orientalis,* Lin.—*C. mindanensis* (the female), also according to Lesson.—*C. scolopaceus.—C. crassirostris.—C. punctatus* and *C. maculatus* of authors.—*Koweel,* H. Fem.—*Koreyala, i. e. spotted Koweel.—Koweel* of Europeans in India.—*Black Cuckoo.*

This well known bird is found in all parts of the peninsula, where there are a sufficiency of trees. It is common in the Carnatic in groves, gardens and avenues, and also in the west coast, but rare in the bare table land. It feeds entirely on fruit, and is remarkably fond of the fig of the banian tree. It has a most peculiarly shrill and piercing call of two syllables, repeated frequently, and every time with increased vigour, so that at the finale it is most piercingly loud. The *Koweel* (as is well known in India) lays its eggs in the nest of the common crow *(Corv. splendens),* from which it dislodges the crow's eggs. It is said always to choose this crow's nest. On one occasion I

obtained an egg from the female *Koweel,* it was of a dirty blue colour, marked with some dusky spots.* Irides fine blood red.

Length of male 15½; of female 16½; wing of latter 7¾; tail 7½; bill at gape 1 $\frac{4}{10}$ths.

GENUS XANCLOSTOMUS, SW.—MELIAS, LESS.—PHŒNICOPHAUS, Auct.

229.—*X. viridirostris.*—New species?—*Melias tristis,* Less.?—*Melias diardi,* Less.?—*Cuc. Sumatranus,* Raffles?.—*Green-billed Cuckoo.*

I cannot find in Lesson or Cuvier a description of this *Cuckoo,* though that of the *Melias tristis* and *M. diardi* of Lesson, somewhat approaches it. It differs, however, in several particulars from either, and especially in size.

Descr.—Above blackish cinereous, with a tinge of green; wings and tail glossy green black, the latter tipped with white; beneath light greyish, with a tinge of fawn colour, and mixed with blackish on chin and throat.

Irides fine blood red; naked eye-spot cobalt blue; bill beautiful apple green; legs and feet greenish black. Length about 15 inches; of which tail is 10; wing 5¼; tarsus 1 $\frac{3}{10}$ths; bill to front 1 inch; at gape 1 $\frac{3}{10}$ths.

The *Green-billed Cuckoo* is found over all the peninsula, but it is an uncommon bird, except in some few localities. I have seen it in thick bamboo jungles at the bottom of the Coonoor pass, in thick hedges and trees in the Carnatic; and in bushy jungle in the Deccan. It wanders about from tree to tree, or works its way through the thick hedges, and feeds on various large insects, such as grasshoppers, mantides and the like; also on caterpillars and other insects. It makes its way with great adroitness through the thick prickly hedges and bushes it delights to frequent.

230.—*X. Sirkee.*—*Eudynamys sirkee,* Gray and Hardwicke's Illlustrations of Ind. Zoology.—*Red-billed Cuckoo.*

I have seen this bird in bushy ground on the top of the Neilgherries, but in no other locality till I lately met with it in a hilly and low jungly district, near Jaulnah. It has the same wandering habits, and same kind of food as the last species.

Irides reddish brown; bill cherry red, yellowish at tip; feet plumbeous. Length 16 to 17 inches; wing 6¼; tail 9½; tarsis 1½; bill to

* This bird is said to be excellent eating.

front 1; at gape $1\frac{3}{10}$ths; feathers of head and neck with the shafts of the feathers black, glistening and bristly.

Genus CENTROPUS, Ill.—*Lark-heeled Cuckoo.*

231.—*C. Pyrrhopterus.—C. Philippensis*, Cuv.—*Corydonix pyrrhopterus*, Vieillot.—*Cen. bubutus*, Horsf.—*Mahooka*, H.— *Crow Pheasant* of Europeans of India.

The *Crow Pheasant* is a common and universally spread bird, frequenting wooded and cultivated grounds, in all parts, and found also in the more open spaces of thick jungles. It is often seen in thick hedges, also in woody nullahs, and in low bushy tracts. It feeds on the ground chiefly, walking and running with great facility, and picking up various large insects, centipedes, lizards, and even scorpions and small snakes. It may often be seen walking along the bank of a dry tank, a bund of a paddy-field, and being a remarkably slow and stupid bird, and of slow flight, it is occasionally run down, or even caught by the hand, in sufficiently open ground. A good shikra will also easily strike it down.

The *Mahooka* has a deep sonorous call, something like '*whoot, whoot, whoot*,' which is often heard in a thick bush or hedge, while the bird itself remains unseen.

Irides crimson red; bill and legs blackish. Length 19 to 20 inches; of which the tail is 10 to 11; wing $7\frac{1}{4}$; tarsus 2 inches; bill to front $1\frac{3}{10}$ths; at gape $1\frac{6}{10}$ths.

Tribe TENUIROSTRES.

Family CINNYRIDÆ.—*Sun birds.—honey eaters.*

Genus CINNYRIS, Cuv.—*Shukur-hora*, H. i. e. *Sugar-sucker.**

232.—*C. Mahrattensis.—Certh. Mahrattensis*, Shaw.—*Cinnyris orientalis*, Frankl.—*C. cyanæus*, Vieill.—*Certhia Asiatica*, Lath.—*C. currucaria*, Auct., Young male.—*Purple honey sucker.*

This appears to be the most generally spread of all the *Cinnyrides*, and is the only one I have met with in the bare table land. In the Carnatic it is less numerous, I think, than the two next species.

* Called *Humming birds* by Europeans in India.

I have lately (February) seen the nest of this pretty little bird close to a house in Jaulnah. It was commenced on a thick spider's web, by attaching to it various fragments of paper, cloth, straw, grass and other substances, till it had secured a firm hold of the twig to which the web adhered, and the nest suspended on this was then completed by adding other fragments of the same materials.

The hole is at one side, near the top, and has a slight projecting roof or awning over it. The female laid 2 eggs, of a greenish gray tinge, spotted with dusky. The first nest it made was accidentally destroyed after two eggs had been laid, and the couple immediately commenced building another, in a small tree at the other side of the door, and, as in the first instance, commenced their operations on a fragment of spider's web. They reared two young ones from this nest.

The *Purple Honey-Sucker* has a very feeble, but sweet, chirping note. It feeds like others of the genus, partly on the honey extracted from flowers, and partly on minute insects, flies, cicadariæ, &c. It occasionally hovers on the wing before a flower, while extracting the honey, but generally hops or flies rather among the smaller twigs. Occasionally I have seen it snap at an insect in the air. Whilst feeding it frequently opens and closes its wings. The *C. currucaria* is certainly the young male of this bird, the outline and structure are the same, and in Jaulnah it is of frequent occurrence, no other species of *Cinnyris* but the *purpuratus* being found here: besides I have specimens in which the change to the adult plumage is nearly completed. I shall add a very brief description to show its difference from the next species.

Plumage above, of a glossy steel blue; beneath glossy purple; quills and tail black; plume of orange and yellow feather under the wing; bill and legs black. Length $4\frac{1}{2}$ inches; wing $2\frac{5}{10}$ths; tail $1\frac{1}{2}$; tarsus $\frac{6}{10}$ths; bill straight to front $\frac{7}{10}$ths.

Female, above greenish brown grey; beneath pale yellow; darkest on the throat; tail black; quills dusky.

I have seen this bird on the very top of the Neilgherries, which shews what a great degree of cold some of this tropical genus will suffer without inconvenience.

233.—*C. polita.*—*Certh. polita*, Lath.—Ois. Dor. pl., 11—*Certh. falcata*, Lath. ?—*Certh. purpurata*, Lath. ?—*Glossy green Honey-sucker.*

I have seen this very handsome bird in the Carnatic and west coast, where it is tolerably common, frequenting both gardens and jungles. Food and habits of the last.

Descr.—Above, glossy green; wings and tail dull black; throat and breast rich purple hue. A narrow bright maroon red collar intervenes between the rich purple of the breast and the dull blackish brown of the belly and vent; a tuft of orange and yellow feathers under the wing, as in the last; bill and legs black. Length $5\frac{1}{2}$ inches; of wing $2\frac{3}{10}$ths; tail $1\frac{6}{10}$ths; tarsus $\frac{6}{10}$ths; bill straight to front one inch. Female, above light greenish brown, quills darker; tail black; beneath pale yellow: only differs from the female of the last in the darker tint of the plumage above.

The male, though sometimes confounded with the last species, differs most conspicuously in the much longer and more arched bill, and the green play of colours in the upper plumage.

234.—*C. Sola*, Vieill. Ency. Meth. and Lesson.—*Certh. Zeylonica*, Lath.—*C. lepida*, Sykes' Cat.? not of other authors.—*Amethyst rumped Honey sucker.*

This species appears to be more abundant in the Carnatic than in any other part of the peninsula. In that district it is very common, and to be seen in almost every garden, flitting about from flower to flower, its brilliant hues every now and then displayed to the eye as it catches their reflection by the sun.

I presume that this is the *C. lepida* of Sykes' Catalogue, as that is an allied species, but the descriptions I have access to of that bird do not agree with this one, and moreover in Lesson's Traité the *C. lepida* is also mentioned as well as this species, and said to have been received from Amboyna. Nevertheless it may also be found in the west of India. Mr. Elliot says of this species "builds a hanging nest with an entrance near the top, opening downwards." I add a brief description: Male, head and angle of the wings glossy green; throat, neck, rump and upper tail coverts ameythystine; back and coverts, with narrow pectoral bar maroon red; beneath yellow, wings brown, quills edged with cinnamon; tail black, bill and legs do. Female, olive green above, beneath yellow, chin and throat white, wings and tail as in male. Length $4\frac{1}{2}$; wing $2\frac{3}{10}$ths; bill straight to point $\frac{5\frac{1}{2}}{10}$ths.

235.—*C. minima*, Sykes.—*Smallest Honey Sucker.*

This lovely plumaged little species I have only found but rarely in high forest jungle in Malabar. It is very much allied to the last in colouring, but differs, besides its smaller size, in the tint of the red on the back, which is much richer in this one; there is no green on the shoulders, the green of the head also is purer; and the quills are not

edged with cinnamon. Length $3\frac{3}{4}$; wing 1 $\frac{2}{10}$ths; bill straight to front $\frac{5}{10}$ths;

236.—*C. Vigorsii,* Sykes.

I have not been lucky enough as yet to fall in with this splendid species of *Cinnyris.*

Genus DICÆUM, Cuv.

237.—*D. concolor.*—New species?

Descr.—Above, brownish olive; beneath greenish white; wing and tail brown. Irides brown; bill and legs brownish cinereous. Length 4 $\frac{2}{10}$ths; wing $2\frac{1}{10}$ths; tail 1 $\frac{1}{10}$th; tarsus $\frac{1}{2}$ inch; bill straight to gape $\frac{1}{2}$ inch; to front $\frac{4}{10}$ths. Sexes alike.

This, if a true species of *Dicæum,* differs from its congeners in the plain and sober colours of its plumage. I have found it in the forests of Malabar, and also on the summit of the Neilgherries. It frequents the highest branches of lofty trees, hopping actively about the small twigs and flower branches, and feeding on various minute insects.

Sub Family PROMEROPIDÆ.

Genus UPUPA, L.—*Hoopoe.*

238.—*U. minor.*—*Hood-hood,* H., from its call.—*Hoopoe.*

The Indian *Hoopoe* is a tolerably common bird in every part of the peninsula of India; frequenting woody places, groves, single trees, hedges, and about old walls and other buildings; and to be seen in almost every garden. It feeds entirely on the ground, walking along with ease, and picking up various insects as it moves along.

The *Hood-hood* (a name which expresses its call much better than our English term) breeds, I am informed by shikarees, in the hot weather in holes of old walls and other buildings.

Tribe FISSIROSTRES.

Family MEROPIDÆ,

Genus MEROPS, L.—*Hurrial,* H.

239.—*M. Indicus.*—*Hurrial* and *Putringa,* H.—*Common Indian Bee eater,* often called by Europeans *Green flycatcher.*

This well known and common bird is spread in numbers over all India. It generally hunts like the true *flycatcher* from a fixed station, which is either on the top or upper branch of a high tree, or on the branch of a shrub or hedge, a bare pole, stalk of grain or grass, or some old building. Here it sits looking eagerly around, and on spying an insect, which it can do a long way off, flies off and captures it on the wing, with a distinct snap of its bill, and then returns to its perch, generally sailing slowly with outspread wings, the copper burnishing of its head and wings shining conspicuously in the sun beams. Sometimes it hunts alone, at other times in small parties, seated near each other; frequently it captures one or two insects before it returns to its perch; and in the morning and evening considerable numbers are often seen, sometimes in company with *swallows*, hawking actively about, and apparently catching many insects. The *bee-eater* also often changes its perch, taking up a fresh one at some distance. It has a peculiar loud, yet rather pleasant whistling note, which it often repeats in the mornings and evenings when gathered together. In the bare table land, the *Hurrial* generally retires to some secluded and jungly districts for the purpose of breeding, which it is said to do in holes in ravines. It sometimes picks an insect off the ground or off a flower or branch.

I have often seen this bird collect towards sunset in small parties on a road, and roll themselves about in the sand and dust, evidently with great pleasure.

Length to end of lateral tail feather $7\frac{1}{2}$; of wing $3\frac{7}{10}$ths; tail $2\frac{8}{10}$ths; two central tail feathers beyond $2\frac{1}{4}$; bill to front $1\frac{2}{10}$ths.

240.—*M. Philippinus*, Auct. P. E. 57.—*Blue-tailed bee-eater.*

This bird, by no means common any where, is rarely met with in the Carnatic or table land, and only, I think, in the cold weather. It prefers a well wooded country, and I have seen it in Goomsoor in open parts of the jungle, and in the west coast occasionally in similar situations. It is almost always found in small parties seated on the tops of high trees, frequently among wet paddy-fields, and in general perhaps, making a much longer circuit than the last one, capturing several insects before returning to its perch. I have on one or two occasions seen it perched on a low palisade overhanging some water, and every now and then picking an insect off the surface of the water. I once saw an immense flock of them at Caroor, in the Carnatic (Coimbatoor district) and in the beginning of March. There were many thousands of them perched on the lofty trees lining the road there, which occa-

sionally sallied forth for half an hour or so, making a great circuit before returning. These birds were most probably what had been spread over great part of that country, now collected to migrate into a more wooded region, during the approaching hot season when insect life is scarce.

Like the last, this has a loud and pleasing sort of whistle, more full and mellow than that of its more common congener.

Length to end of lateral tail feathers 9½ inches; two central feathers beyond 2 inches; of wing 5¼; tail 3¾; bill to front 1½.

241.—*M. quinticoler,* Vieillot, Encyl. Method. p. 393.—*Chestnut-headed bee-eater.*

I have only seen this bird on two occasions, once at the foot of the Coonoor pass in dense jungle, and again in an open forest on the Malabar Coast. It pursued insects from a fixed perch, returning after having captured one—was generally seated on a low bough, solitary, or two or three together. Irides fine red.

Length 9 inches; wing 4 $\frac{3}{10}$ths; tail 3¼; bill to front 1 $\frac{3}{10}$ths.

There is no *elongation* of the central tail feathers.

242.—*M.? cyano-gularis.*—New species?.—*Nyctiornis?.*—*Blue-throated bee-eater.*

Descr.—A broad blue stripe extends from the base of the lower mandible down the throat and breast; upper part of the body, the head and tail, green, with a bluish tinge; belly of a buff colour, with dashes of green; eye, bright scarlet; bill and feet brownish black.

Length 14 inches; wing 5½; tail 6; tarsus ½ inch; bill 1¾.

I have two or three times observed this fine species of *bee-eater* at the foot of the Coonoor pass of the Neilgherries, in dense and lofty jungle. One time it was alone, the other times I observed it in pairs, perching on the tops of the highest trees, and flying before you from tree to tree. I was not fortunate enough to obtain a specimen, owing to their extreme wariness, but was kindly allowed to inspect and examine a specimen procured by M. Delessert. I suspect from the shortness of its wing that it is a *Nyctiornis* of Swainson.

Genus CORACIAS, L.—*Roller.*

243.—*C. Indica,* L.—*C. Bengalensis,* Steph.—*Cor. nœvia,* Vieill. and Less., Edwards pl. 326.—*Subzuk* and *Neelkond,* H., both words having reference to its colours.—*Tās,* Mahr. from its call.—*Indian Roller,* generally called *Jay* by Europeans.

The Indian *Roller* is of universal distribution throughout the country, as well in jungles as in the open country, there being few groves of trees near a village that do not harbour some. It generally takes its perch on the top or outermost branch of some lofty tree, and on spying an insect on the ground, which it can do at a very great distance, 40 or 50 yards and more, it flies direct to the spot, and generally seizes it on the ground, and then returns to the same tree and perch. A favourite perch of the *Roller* is a bowrie pole, or some bare leafless tree, by which it can command a larger range of view. It occasionally seats itself on a low bush, or even on the ground. I have on several occasions seen one pursue an insect in the air for some distance. It flies in general with a slow but continued flapping of its wings, but it has the habit of occasionally making sudden darts in the air in all directions. It has a harsh grating cry which it often utters on being disturbed. Its food is chiefly large insects, such as grasshoppers and their larvæ, caterpillars, mole-crickets, and even mice, which according to the shikarees are a certain bait for the *Subzuk*. I have frequently seen it caught by baiting with mole-crickets *(Gryllotalpæ)* placed at a great distance from its perch.

Irides dark red brown; bill brown; legs orange. Length 13½; wing 7¼; tail 5; tarsus 1; bill at gape 1 $\frac{7}{10}$ths.

Towards the north of the Deccan at Jaulnah, shikarees inform me that another kind of *Subzuk*, which they call the '*Pindareea Neelkund*,' makes its appearance for a short time during the commencement of the cold weather. Is this the *Eurystomus Orientalis*?

Family HALCYONIDÆ.—*King-fishers.*

Genus HALCYON.—Sw.

Sub-Genus HALCYON.—Sw.

244.—*H. Smyrnensis.—Alc. Smyrnensis,* Auct.—*Kilkila,* H.—*White breasted King-fisher.*

This is the most common and generally spread of the Indian *King-fishers*, frequenting not only the banks of rivers and brooks, tanks, wells, and wet paddy-fields, but also dry cultivated ground, groves, old walls, and many other similar situations. It preys upon small fish, frogs, tadpoles and various water insects—also on small lizards, grasshoppers and various other large insects.

It has a very loud harsh rattling scream, generally uttered during flight. Is said to breed like the other *King-fishers* in holes on the banks of rivers. It is readily taken with a bait of a mole-cricket. Irides light brown; bill and legs red.

Length $11\frac{1}{2}$ inches; wing $4\frac{4}{10}$ths; tail $3\frac{1}{4}$; bill to front $2\frac{2}{10}$ths; at gape $2\frac{8}{10}$ths.

245.—*H. capensis.*—*Alc. capensis*, Auct.—*Malah-Poymah*, Mal. i. e. *Jungle King-fisher.*—*Large Jungle King-fisher.*

This large *King-fisher* is found wherever there is lofty jungle. I have seen it in Goomsoor, Malabar, and Travancore; also once lately in a well wooded brook in the northern part of the table land. It frequents brooks, rivers, and tanks, and, in the instances I have observed, always feeds on fish. Irides light brown; bill deep lake red; feet vermilion red.

Length 14 to 16 inches; wing $5\frac{5}{10}$ths; tail 4; bill to front 3 inches to $3\frac{3}{10}$; at gape $3\frac{8}{10}$ths to 4 inches.

Sub-Genus CEYX.

246.—*C. microsorna*, Burton, Proc. Zool. Soc. 1837?.—*C. purpureus*, Less.?—*C. tridactyla*, Sykes' Catalogue.—*Three-toed King-fisher.*

Not having obtained this little *King-fisher*, I have given the above names as synonymes with doubt. I have once or twice only observed this rare bird frequenting a tank in the northern part of the Deccan.

Genus ALCEDO.

Sub-Genus ALCEDO.

247.—*A. Bengalensis*, Gmel., Edw. pl. 11.—*Chota Kilkila*, H.

This species, so nearly allied to the European one, is common over all the peninsula, frequenting chiefly brooks and rivers, and feeding on small fish, and various aquatic insects. I possess a variety in which there is a good deal of white on the head, back of neck and back. In this one too the bill is entirely black. I may also remark that in some the shade of the plumage is bluish green, in others of a pure blue. Irides dark brown; bill black above; lower mandible orange; feet orange.

Length 7 inches; bill to front $1\frac{4}{10}$ths.

Sub-Genus ISPIDA, Sw.

248.—*I. rudis.*—*Al. rudis,* Auct.—*Koreyala Kilkila,* H.—*Black and white King-fisher.*

Common over all India, frequenting brooks, rivers and tanks. Unlike the other *King-fishers* which watch for their prey from a fixed station, and then dart down obliquely on it, the *spotted King-fisher* searches for its prey on the wing, hovering over a piece of water like some of the *Terns,* and then darting down perpendicularly on it. Irides hazel brown; bill and legs black.

Length 11 to 11½ inches; wing 5½; tail 2½; bill to front 2 $\frac{3}{10}$ths; at gape 2 $\frac{8}{10}$ths.

Family TROGONIDÆ.

Genus TROGON, L.

Sub-Genus HARPACTES, Sw.

249.—*H. Malabaricus,* Gould's Monograph?—*Trog. fasciatus,* Lath.—*Tro. Kasumba,* Raffles.—*Tr. Condea,* Temm. P. C.—*Koofnee Chooree,* H. of some shikarees.—*Kurna,* Mahr.—*Kakerne hukki,* Can.

This very richly plumaged *Trogon* is of rare occurrence in Southern India, and I have only found it in the densest portions of lofty jungle in Malabar and the Wynaad. It is, however, enumerated in Mr. Elliot's Catalogue. It is generally seen seated motionless on the branch of a tree, occasionally flying off to capture an insect, and sometimes, though rarely, returning to the same perch, generally taking up a new position, and wandering much about from tree to tree. I almost always observed it solitary—occasionally in pairs, and on one occasion four or five were seen together. In the stomach I have always found fragments of large coleopterous insects. The Hindoostanee name *Koofnee Chooree,* is given (says Mr. Elliot) " from its sitting with its head sunk in the shoulders, as if it had no neck, or as if dressed in a faqueer's '*koofnee.*' " Irides deep brown; bill and naked skin of fine deep cobalt blue; legs light blue.

Length 12 inches; of which the tail is above 6; bill straight to gape 1 inch.

The female differs from the male in wanting the black head and neck, which are of a light greenish brown. The belly is ochreous instead of

red, and the wing coverts are light ochreous brown, finely streaked with black, instead of black and white.

Family CAPRIMULGIDÆ.—*Night-jars.*

Genus CAPRIMULGUS, L.

Sub-Genus CAPRIMULGUS, Sw.

Chippuk, H. vulgo *Dubchooree* or *Dubhuk*—also *Undhe-chooree*, names given from its habit of squatting.

The species of this genus so much resemble one another that it is almost impossible to make them out from description alone, and I feel uncertain whether I am referring my specimens to their proper places. Four species have been described as inhabitants of the continent of India. I also possess what I consider four distinct species, and shall in the proper place describe the most essential points of difference between these four Indian *Night-hawks*, without reference to any others of the genus.

250.—*C. monticolus, Frankl.* Cat.

The only specimen of this species which I procured was immediately below the Ajunteh ghaut, in the low land of Candeish, so that the name of '*monticolus*' appears inappropriate to its habits in this part of the country, whatever they may be in Bengal. It differs remarkably from the other Indian *Caprimulgi* by the two external feathers of the tail being entirely white, tipped with mottled brown. The white marks in the four external quill feathers also are much larger than in any of the others.

Length of my specimen 10 inches; of wing which reaches to the end of the tail 8; tail $4\frac{1}{2}$; tarsus $\frac{7}{10}$ths.

251.—*C. Indicus*, Lath. ?—New species ?—*Neilgherry night-jar.*

I have temporarily placed this bird under the old name of *C. Indicus* of Latham, chiefly from the fact of its being feathered to the toes, as the *C. Indicus* is represented in the figure in Gray and Hardwicke's Illustrations of Indian Zoology. It differs, however, from the description and figure of that bird in having much less rufous tint, and being of a darker shade altogether, both above and beneath. This may depend

however, partly on age. I shall here give a brief description—plumage generally of a light cinereous, very much mottled with black and dusky, and in parts tinged with light fawn and cream colour; ears black, edged with light rufous; line below the ears extending along the gape, and throat spot, white. White marks on the four quills small. All the tail feathers, except the two centre ones, tipped with white, with a dusky margin. Wing not reaching to the end of tail which is long.

Length $11\frac{1}{2}$ inches; wing $7\frac{1}{2}$; tail $5\frac{6}{10}$ths; tarsus, feathered to the toes, not quite $\frac{6}{10}$ths.

Besides the differences above mentioned, the inner surface of the quills are represented in Hardwicke's drawing as being spotted on both sides with rufous white. In my specimen the external quill alone is spotted on the outer web only, and with very minute whitish marks.

I have only seen this *night-jar* on the summit of the Neilgherries, frequenting the stony hills, and during the day taking refuge in the woods.

252.—*C. Asiaticus*, Lath.?—*Small night-jar.*

The species which I shall for the present consider as the *C. Asiaticus* of Latham, is the smallest and most generally spread of all the Indian *night-jars.* I have found it in the Carnatic, west coast and Northern Circars, but not yet seen it on the table land, where, however, it was obtained by Col. Sykes. My specimens differ from the figure in Hardwicke's Illustrations, in wanting the black ear and sides of throat, but appears to resemble it much in other respects.

Length $8\frac{3}{4}$; of wing $5\frac{1}{2}$; tail $4\frac{1}{4}$; tarsus $\frac{7}{10}$ths.

253.—*C. Mahrattensis*, Sykes?—New Species?—*C. Asiaticus.*—var.?

This night-jar, which for the present I place under Col. Sykes' new species with doubt, very much resembles the last in the general distribution of the colours, but it is of a lighter tint throughout, and the rufous of the last is replaced in parts by a lighter or cream coloured hue. It much resembles the drawing of *C. Asiaticus* in Gray and Hardwicke, with which I suspect it is identical. It differs from Col. Sykes' description of his *Mahrattensis*, in having a sub-rufous or fawn coloured collar on the nape of the neck, and in the size and length of the tail, as given by Sykes, whose species, if these are permanent differences, is probably a different, though nearly allied bird, as it is stated by Sykes to have the two external tail feathers, only, tipped with white, like these two last ones, which after all I suspect may be perhaps but mere varieties, this one differing chiefly in size, and the lightness of

its plumage. In this case, however, there will still remain a fourth species, viz. Col. Sykes' '*Mahrattensis.*'

My specimens were found in the northern part of table land near Jaulnah. Length rather more than 9½; wing 6; tail 4½; tarsus nearly $\frac{8}{10}$ths.

All the species of the *night hawk* I observed have the habit, when roused in the day time, of flying a short distance, and then alighting on the ground and squatting close, not moving from the spot where they have first alighted. The note of the common one (No. 252), as well as of the Neilgherry species, both resemble the sound of a stone scudding over ice, or, as is well represented by Mr. Elliot, sound like the word *tyook, tyook, tyook.* Mr. Elliot in his notes states that he once found the eggs of the common species (two in number) placed on the ground without any nest. They were pink, spotted with brown.

Family HIRUNDINIDÆ.—*Swallows.*

Genus CYPSELUS, L.

Sub-genus CYPSELUS, Sw.

254.—*C. Alpinus,* Temm.—*H. Melba,* Auct.—*Large mountain Swift.*

As far as I can judge from descriptions, my bird is the same as the European one. I first observed it on the road between Madura and Palamcottah, when an innumerable flock passed over camp from the range of eastern ghauts, travelling towards the east coast. It was almost mid-day in the month of August. They kept a steady easterly direction. I afterwards saw in Travancore single birds, flying about at an immense height with great rapidity. I also saw them on the top of the Neilgherries, towards the edges of the hills, and also at Madura, flying in small parties every evening, just before sun-set, towards the east coast, apparently from the hills in the neighbourhood, as I did not see them during the day time. Its flight is amazingly rapid. Length 9 inches; wings beyond 2 inches; from flexure 8½; tail 3; bill straight to gape 1 inch.

255.—*C. affinis,* Hardwicke, Gray and Hardw. Ill. Ind. Zool.—*Ababeel,* H.—*White-rumped Swift.*

This species, though of general distribution throughout the peninsula, yet at the same time is so partially distributed as to have caused

Col. Sykes to say in his Catalogue "so rare in the Deccan that I have only obtained 2 specimens." It is found in all districts of India, but in these is often confined to a small tract in the neighbourhood of some few large pagodas, large old choultries, and other similar buildings. In the Carnatic it is common at Madras, at the rocky fort of Trichinopoly, and very numerous at the large pagodas of Madura, among which their nests are thickly crowded. On the west coast I saw it on several occasions, chiefly among rocky hills, but only observed it twice or thrice throughout the whole length of the table land from the Tapoor pass to Jaulnah, and then but few in number. At this latter place, however, it is very common, breeding in some old choultries and other buildings. It seldom, I think, takes a very long range from its breeding places. It builds its nest in company always, often thickly crowded together, placing them in corners and crevices of old buildings, and forming them of clay, profusely mixed with straw, grass, feathers and other soft substances, of which they appear externally to be entirely composed. During the night they roost in their nests, four or five often occupying the same one, as I observed in the celebrated choultry at Ajunteh.

The eye of this *Swift* is deeply seated, the eyebrow overarches it, and a ridge continuous with the eyebrow extends along the gape.

Length about $5\frac{1}{2}$; wing beyond $1\frac{1}{2}$; from flexure 5; tail $1\frac{6}{10}$ths.

256.—*C. palmarum*, Hardw., Gray and Hardw. Ill. I. Zool.—*Balassian Swift*, Lath.

This little species is common in all the districts of India, except on the bare table land, where it is rare. As its name implies, it frequents groves of palms, especially the palmyra *(Borassus flabelliformis)*, and does not in general fly to any distance from them. It is very abundant in the Carnatic. According to Hardwicke it builds its nest on the leaf of the palm.

Length $5\frac{1}{2}$; tail $2\frac{1}{2}$; wing $4\frac{1}{4}$. This bird is said in some works to be nocturnal. I need hardly add that such is not the case.

Genus MACROPTERYX, Sw.—*Swallow-tailed Swift.*

257.—*M. longipennis.*—*C. longipennis*, Temm. P. C. pl. 83.—*Hir. Klecho*, Horsf.—*Crested long-winged Swift.*

This very elegant *Swift* is only found in the South of India, in high forest jungle in the neighbourhood of hills. I have seen it in Goomsoor, at the foot of the Neilgherry hills, and in various parts of the

jungle of the western coast. It frequently perches on bare and leafless trees. While on the wing it has a somewhat loud parrot-like cry, very different from that of the other species.

Irides deep brown; bill black; legs bluish black; soles of feet reddish white. Length about 10 inches; wings 6; tail 5; 1¼ inch longer than the wings.

The female differs from the male in having black ears instead of rufous, and in having a white streak along the gape. The elegant frontal crest of this species is frequently raised when the bird is sitting.

GENUS HIRUNDO, L.—*Swallow.*

258.—*H. Jewan,* Sykes.—*H. Javanica,* Lath.?—*Common Swallow.*
This is perhaps the most generally spread, and abundant of the Indian *Swallows,* being found in all parts of the country, frequenting both the neighbourhood of water, and open plains and gardens. It appears to differ but very slightly from the European swallow. I do not know if it breeds in this country, but think not; and it certainly disappears from some places during the hot season and monsoon. If it does not breed in the North of India, it probably spreads over the north of the Asiatic continent.

Length 7¼; wing 4¾; tail beyond 1 $\frac{4}{10}$ths; from base 4.

259.—*H. Erythropygia,* Sykes.—*Red-rumped Swallow.*
This *Swallow* in general, prefers the proximity of jungles. I saw it in Goomsoor, in the jungles round the Neilgherries (and also on the summit of the hills), in various other parts of the west coast, and in the Carnatic, at the Tapoor pass. In the northern part of the table land, however, I have seen it occasionally in the cold weather only, both in the neighbourhood of water and on dry open plains. It often is seen in the jungles it frequents, seated in great numbers on a tree. Mr. Elliot says of this species "flies after insects, and when its mouth is full sits on a tree to devour them." This bird varies a good deal in size. My specimens vary from 6 to 7½ inches long, of one of the latter the wing is 4½; and tail nearly 4.

260.—*H. filifera,* Stephens.—*H. filicaudata,* Frankl. Cat.—*Leishra,* H.—*Wire-tailed Swallow.*

This, by far the most elegant of its genus, is only found towards the more southern portion of the peninsula, about water. In the more

northern parts, however, it is more abundant, and generally spread, frequenting not only the neighbourhood of water, but also fields, gardens and open plains. It is found in small parties of 4, 6 or more. It breeds in holes of old walls and buildings, generally in the neighbourhood of water, also in wells and bowries, forming a small mud nest much open at the top. Its long tail feathers are only observable at a few yards distance, and in consequence of this, nine-tenths of Europeans here are unaware of its existence. It occasionally perches on trees.

Length to end of true tail $4\frac{1}{2}$ to $4\frac{3}{4}$; of wings ($1\frac{1}{2}$ inch beyond tail) $4\frac{6}{10}$ths; tail $1\frac{1}{2}$; long thread-like feathers beyond tail 5 inches; and more even.

261.—*H. concolor*, Sykes.—*Small black Swallow.*

I have never observed this plain coloured *Swallow* in the Carnatic, northern division, or west coast, and only towards the more northern portion of the Deccan. It is by no means numerous here—is solitary, frequents tanks and rivers, and also gardens, fields and villages. It breeds in the caves of houses, in high walls, and other buildings. Length to end of tail $4\frac{6}{10}$ths; of wings 4; tail 2.

262.—*H. Unicolor.*—New species.—*Hill Swallow.*

Descr.—Entirely of a glossy cinereous, or mouse brown; darkest on head, wings and tail, and with a tinge of green, and palest beneath.

Length $4\frac{3}{4}$; of wing $4\frac{1}{2}$; beyond the tail 1 inch; tail 2; slightly forked and with the feathers very broad. The bill of this *Swallow* is much smaller than that of any of the Indian ones, and is also much hooked. It most closely resembles the *Cyp. palmarum* in colour. Tarsus $\frac{3\frac{1}{2}}{10}$th; feet very small.

I have only found this remarkable species on the Coonoor pass of the Neilgherries, and about the edges of the hills. It flies in large flocks, and with very great speed.

263.—*H. Sinensis*, Gray and Hard. Ill. I. Zool. ?.—New species ?—*River Martin* of India.

I know not if the little *Martin* I possess, be referable to the species above named or not, though I think it is probably distinct. I have only found it on one or two occasions in small parties, frequenting rivers, and breeding in holes in the river banks, during the month of December. I add a brief description.

Above of a light brown colour, lightest on the rump; wings and tail dark brown; chin, throat and breast, pale brown; belly, vent and under tail coverts, white.

Length $4\frac{1}{4}$ inches; wing $3\frac{1}{2}$; tail $1\frac{6}{10}$ths; wings reach $\frac{1}{2}$ an inch beyond tail, which is very slightly forked; tarsus $\frac{4}{10}$ths; bill to front $\frac{3}{20}$ths.

264.—*H. riparia*, L?.—New species?

This *Swallow* I venture to place (though with hesitation) under the European species, as I see it is enumerated in Franklin's Catalogue. It differs from the last named species, chiefly in its larger size, lighter coloured wings and tail, whitish throat, and in the rump being of the same shade of colour as the back.

Length $4\frac{3}{4}$; wing 4; tail 2; sligtly forked; tarsus hardly $\frac{4}{10}$ths; feathered on the back down to the hind toe.

I have hitherto only seen this species on one or two occasions in the neighbourhood of Jaulnah. It was on both occasions single, but flying in company with other swallows (*H. Jewan* and *H. filifera*) in the close neighbourhood of water.

II.—*Account of a Carboniferous Stratum at Baypoor near Calicut, Malabar Coast.—By Lieut.* T. J. Newbold, 23*d Light Infanty.*

In consequence of having observed some carbonaceous bits of clay in the bed of the river at Baypoor, a sea port town about 6 miles south from Calicut on the Malabar coast, in lat. north 10° 11′, and long. east 75° 53′, I took a canoe and proceeded up the river in order to examine the section of the strata, its northern bank afforded. It presented steep cliffs, varying from 20 to 40 feet in height, which, near the mouth of the river immediately below the traveller's bungalow, consisted of a gritty laterite; that further up the river passes into a horizontally stratified loose grit or sandstone; this often becomes compact and variegated with red and yellow bands. Beds of an ochreous yellow earth tend to loosen its structure, near which it assumes a friable, earthy, character.

Not far from the bungalow, underlying these beds at the foot of the cliffs, near the river bed, and washed by the tide at high water is a seam or stratum of carbonaceous shale, passing into a black clay from

the saline moisture to which it is continually exposed, and imbedding carbonized branches, leaves and trunks of trees. This bed varies from a few inches to five feet in thickness, dipping 4° towards the north-east, and can be traced about half a mile in an easterly direction up the northern bank of the river. It is intersected by deep, nearly vertical fissures, which are crossed in various directions by others more superficial. Its structure is obscurely laminar, and the more earthy portions of it glitter with minute micaceous particles. Other portions seem to consist wholly of carbonized woody matter, and have a tough elastic feel under the hammer. Its colour varies from a greenish black to a jet black. In two situations it imbedded numerous small shells, some of which had been reduced to fragments, and differing from the shells at present found in the river. The identification of these shells would probably afford an insight into the age of the laterite hitherto a desideratum in Indian geology. Should we feel disposed to refer the age of this carbonaceous deposit to that of the coal measures of Europe, the laterite here might be classed with the new red sandstone. The black shale and clay is highly impregnated with sulphate of alumina, and is somewhat analogous to the aluminiferous shale of the coal measures; and, like it, as before remarked, contains micaceous spangles disseminated. The surface and sides of the fissures are frequently coated with a yellowish efflorescence consisting chiefly of sulphur, iron and alumina: the two former of which appear to be in process of combination into the pyrites, usually seen in coal, rather than the result of decomposition from pyrites. The whole has a distinctly sulphureous odour. The carbonized branches, leaves and trunks of trees lay in a horizontal position in the black shale; from which, in consequence of their weathering less, they often projected where washed by the tide. The external longitudinal fibres and annular concentric delineations of some exogenous trunks were perfectly distinct. Some fragments were brown, heavy, tough, and woody; others brittle, with a brilliant fracture resembling a jet, light and bituminous; on some the thin bark was perfectly distinct, and exhibited in a beautiful manner the different stages of the carbonization of wood. Many fragments were penetrated with water, holding iron in solution, which had left on the surface a glittering reddish brown enduit.

The whole appearance of these strata, their situation and the horizontal position of the trees, leaves, and plants embedded in them, fully bear out the theory of the formation of our coal-fields and wealdens (viz. that they are the successive deposits of drifted trees, plants, clay and sand on the bed of a river or estuary) against the objections of a late

writer, Mr. Beaumont, who is of opinion that the coal vegetations grow and accumulate where they are found, on the surfaces of small islands, which have been subsequently submerged by the ocean. However, there appears to me to be no objection to the existence of both theories, if made applicable to the different conditions under which the coal-fields are found. The combination of iron, sulphur, and water in the deposits at Baypoor, has evidently afforded the principal chemical conditions for ligneous carbonization.

The following are the measurements of a section of the cliff and carboniferous stratum of Baypoor in a descending order:—

1st. 4 feet of sandy alluvial soil.

2nd. 10 feet of loose sandstone with beds of ochreous earth.

3rd. 20 feet of gritty sandstone, passing into gritty laterite, and variegated in its lower portions with red and yellow bands.

4th. carboniferous stratum varying from a few inches to five feet in thickness.

5th. level of the river.

The haste with which I was travelling prevented my examining the specimens as minutely as I could have wished; but the following results obtained by the blow-pipe will not be uninteresting. The leaves and stems of plants burnt slowly, with a faint flame of a bluish red tint, emitting a smell like that of coal, and leaving a reddish and whitish ash, the white appearing near the edges. This ash being submitted to the reducing flame, fused partially on its edges, exhibiting points of a greenish enamel, and others of a dark slag, attracted by the magnet. The black clay and shale, on the oxidizing flame, decrepitates, turns grey, and emits an odour of coal more or less distinct and sulphureous according to the predominance of earthy or carbonaceous matter in the specimen selected for examination. The change of colour exhibits the delicate fibres of plants in its structure, that were invisible previous to the application of heat. In the reducing flame it fuses into a light greenish grey enamel, or dark slag attracted by the magnet. The fibrous, heavy, carbonized wood burnt with scarcely any flame at all into a reddish cinder, giving out an odour, like that of burning coal. This finally fused, with slight gaseous extrication, into a black slag, powerfully attracted by the magnet. The yellowish sulphureous cauliflower-like efflorescence, before mentioned as encrusting the surface of the black shale, emitted distinct fumes of sulphur, and melted in the oxidizing flame, giving out numerous gaseous bubbles, into a dark cinnabar-red globule; which, on being exposed to strong

heat, was converted, with considerable diminution of bulk, into a black magnetic slag.*

I observed traces of a similar carbonaceous bed in the banks of the Tirtalla river in south Malabar, between Paulghaut and Calicut; and Colonel Cullen informed me, that he had discovered, so far back as 1832, a carboniferous seam, four or five feet thick in its broadest part, in a perpendicular cliff of laterite at Vorkully, a little south of Quilon. The cliff he described to me as about eighty feet high, facing the sea, and resting immediately on garnetiferous gneiss. The black aluminous shale and clay imbedding the carbonized wood was saturated with the moisture which percolated through the spongy substance of the superincumbent laterite. The specimens given me by Colonel Cullen, and for which I feel much indebted, assimilated in every respect those of Baypoor; except that the proportion of sulphureous matter was less in the former. Colonel Cullen also informed me that he observed some carbonaceous looking strata near Cannanore. It would seem therefore that their extent on the Malabar coast is considerable, and it is possible that they may be a continuation of one great deposit, or basin, the southern edge of which may be the stratum observed near Quilon, which Colonel Cullen states to be inclined at a considerable angle with the horizon. A few well conducted boring experiments made in favourable situations within this area, which is almost entirely occupied by the laterite, would serve to elucidate this point, and perhaps bring to light a more perfectly formed seam of coal. If so, its proximity to the coast and Bombay, and facilities of water carriage, would give it great advantages over the produce of the coal fields in the interior of Bengal.†

Colonel Cullen has accordingly favoured us with the following observations on his discoveries on the Western Coast, referred to in Mr. Newbold's paper.—Editor.

" I have no notes taken at the time, and I can only therefore now state generally from memory the appearances of these deposits.

" The deposit at Cannanore was examined very superficially. It consists exclusively of an aluminous clay or shale of a dark carbonaceous

* The carbonized wood with a shining fracture like jet, burnt into a light cinder with considerable flame.

† I have forwarded specimens of the Baypoor stratum for the museum of the Society, by sea from Cannanore.

colour, and was discovered accidentally, at the base of the laterite cliffs on the sea-shore at Cannanore, in February 1830. The cliffs are about fifty or sixty feet high. Their upper portion consists of the usual indurated dark red ferruginous clay; but, as the depth from the surface increases, the colours become greatly brighter and more variegated, and the clay soft and sectile and full of moisture; water in several places penetrating through the cliff. The aluminous or carbonaceous stratum is near the base of the cliff, and from the moisture it has a perfectly black appearance. I do not recollect any appearances of fossil vegetable matter—nor was I then aware of the Quilon deposits—and, being unwell, did not repeat my visit.

" The carboniferous deposit in Travancore, was pointed out to me in 1832, when on a visit. It is near the village of Vorkully, about fifteen miles S. of Quilon, and in the cliffs immediately on the sea-shore. The cliffs are here about eighty feet high, quite perpendicular, the upper portion consisting as usual of the indurated dark red laterite; gradually changing, as the depth from the surface increases, into bright and variegated colours, as at Cannanore. The carboniferous bed here is very conspicuous. It lies in an inclined position; the upper part of the bed about sixty feet from the top of the cliff, and the lower portion within five or six feet of its base, and easily accessible therefore. It was full of moisture, and water streamed from it. Above and below the bed, to the very base of the cliff, is composed exclusively of these variegated laterite clays. I do not think that the carboniferous stratum passed below the surface of the beach; if I recollect correctly, it terminated abruptly within five or six feet. It was quite insulated, and of a lenticular form, five or six feet thick at the most. The specimens of fossilized wood, both monocotyledonous and dicotyledonous, and the shale or clays of this stratum, have already been forwarded to the Society. I may add that the laterite in which these carboniferous beds have been discovered, appears to repose, as throughout Malabar, immediately on gneiss, masses of which appear in the sea, close to the cliff at Vorkully, and are to be found also in abundance within a few miles S. of the deposit at Cannanore."—W. C.

III.—*Note on the Geological position of the Laterite in the vicinity of Beder.*—*By Lieut.* T. J. Newbold, *23d Light Infantry.*

In presenting to the Society an additional number of geological specimens from the Nizam's dominions, the Southern Mahratta Country, and the western ghauts, I have deemed it necessary to offer a few explanatory remarks on the geological *situs* of those collected in the vicinity of Beder. It was partly with the view of ascertaining the relative position of the laterite with regard to other rocks, that I was led to visit this ancient Mahomedan capital.

From the village of Cummumpilly, twenty-six miles E. S. E. from Beder, on the Hyderabad road, by Beder, to the western confines of the Nizam's dominions, the only rocks observed are the overlying trap, associated with amygdaloid, wacké, laterite, and a conglomerate formed from the *débris* of the laterite, with the exception of a narrow zone of grey limestone on the banks of the Bhima. The laterite is first seen resting as a bed, about 100 feet thick, on a trap hill, shaped like a truncated cone, near Sungum, about sixteen miles E. S. E. from Beder. Thence it continues capping the trap elevations with little interruption, forming the surface rock of the extensive table land on which the fortress and city of Beder stand. Here it rises in cliffs from 60 to 200 feet high, the trap appearing at their base, and continues capping most of the higher summits by Calliany to Gulberga; while the trap is seen forming the base of the plain and lower hills, to the bed of the Bhima. From this, across the frontier, the laterite and its conglomerate are occasionally observed in the Southern Mahratta Country, at Ingleswara, and in the vicinity of Bagwari and Belgaum, always overlying the trap on its associated wacké or amygdaloid.

The localities around Beder, where the best sections are afforded, exhibiting the superposition of the laterite on the trap, are some of its deeply sunk wells, and the base of the cliffs to the east, west and north. The rocks near their junction, are more or less blended together, which renders it difficult to draw a line of demarcation between the two. The trap is generally in a soft friable state, and the laterite abounding in lithomargic earth,—conditions, the explanation of which will be attempted elsewhere. The former rock, however, is little altered in one situation where it comes in contact with the laterite, viz. in the section afforded by the well, called the Begum's bourie, which lies a little to the S. E. of the mausoleum of the Mussulman Pir-zadeh, Shimilla Hussaini.

At the base of the cliffs west of Beder, veins of manganese, blended with iron ore, intersect the laterite near its contact with the trap, which appear to have penetrated from below. I am not aware whether the occurrence of similar veins in laterite has been previously noticed by geological observers. They were seen subsequently in the laterite of Ingleswara, and also in the sandstone near its contact with the trap, between Kulladghi and the falls of Gokauk. It is not improbable that the purple colour of the lithomarge, and that of the veins of amethystine quartz in the vicinity of Hyderabad, near which I detected manganese, may be owing to the presence of this mineral.

The soil on the surface of the elevated table land of Beder, is the result of the decay of the subjacent laterite, intersected by belts of black cotton soil. Voysey noted four well defined zones of this soil, running north and south, and lying between "ridges of iron clay," on the road from Beder to Shelapilly.

The laterite, as on the Malabar coast, is quarried at Beder, Calliany, and Belgaum, and extensively used for building. At Calliany shops and houses, now deserted, have been excavated in the solid rock; it is also employed, when ground into a clay with water, as a water-proof cement for the flat roofs of the houses in the last named town. The amygdaloid associated with the trap and laterite imbeds most of the minerals noticed in the great overlying trap formation of the Deccan, viz. calcedony, cornelian, semi and common opal, cacholong, calcspar, agate, jasper, heliotrope, a variety of zeolites, glauconite, olivine and augite.

IV.—*Geological Desiderata.—By* Lieut. T. J. Newbold, 23*d Light Infantry.*

1.—Observations on the direction of mountainous elevation throughout India, with reference to Elie de Beaumont's theory of the determination of the epoch of their *soulevement.*

2.—Connected and extended observations on the dip and direction of the stratified rocks, from the plains to the bases of uplifted abnormal masses. These observations should be continued on every side of the bases, and carried on in connexion with similar observations on the dip and direction of the joints and cleavage of rocks. The petrographical character of the rocks in all cases should be carefully noted. Little

attention has hitherto been paid to these important subjects by Indian geologists.

3.—Observations tending to elucidate the causes and conditions of the modifications of structure and morphic changes, remarkable in even continuous, and apparently homogeneous masses of both normal and abnormal rocks; and especially obvious near their line of contact with rocks of a different mineral character.

4.—Similar observations on basaltic dykes, and the rocks they pass through; noting the various amount of disturbance and alteration, with reference to the magnitude of the dyke. It will not escape the attention of observers that the basalt itself has been in some measure reciprocally acted upon by the rocks it penetrates. For instance,—the basalt passing through the clay-slate of the eastern ranges of the Ceded Districts, which is frequently converted into flinty slate or becomes crystalline and hornblendic, acquires a distinctly slaty structure, and so much modified in mineral character as scarcely to be distinguished from the altered clay-slate in its vicinity. In thin veins and near the edges of large dykes the basalt becomes compact; but towards the centre, where more slowly cooled, it is almost invariably of a crystalline, and sometimes of a porphyritic structure. Where basaltic dykes abound a general tendency to crystalline and metallic development will be remarked; as well, perhaps, as an increase in the deposition of saline and calcareous matter,—the sub-carbonate, muriate, and sulphate of soda. Those extensive depositions of nodular, tufaceous, travertine-like, and friable carbonate of lime,—the well known *kunkar* of India,—appear to have their origin from springs rising up from nearly vertical fissures in the subjacent rocks, which are invariably more numerous in the vicinity of great basaltic dykes, and have been caused, possibly, by the same disruptive forces that opened a vent to the basaltic matter with which many of the greater cracks are filled. A series of extensive observations incline me to the opinion that this basalt, and not granite, as generally thought by Indian geologists, is the lowest rock found in peninsular India, and that its development has a much greater influence over the direction and altitude of mountain chains than the usually supposed granite; which, though frequently observed with the uplifted schists resting on its shoulders, will, where opportunities of examination occur, be found to be merely an intermediate rock between the basalt and the normal rocks it underlies. It must not be forgotten in making comparative observations on the direction of the basaltic dykes, and on that of the mountain chain near which they occur, that we are most frequently doing so on branches merely from the main dyke, which diverge from it at various angles with its course, while the main dyke

is often concealed from view by the masses of rock it has uplifted. It is in the deep transverse valleys and clifts through ranges, and in low situations near their termination, in wells and other artificial or natural sections, that we are most likely to discover the true direction of the main dyke. To the *soulevement* of some of these branches may be attributed those low ranges of hills, called spurs, that often diverge at right angles from the direction of the principal chain.

5.—The calcareous deposits I have alluded to in No. 4, may be divided into two classes—ancient and modern. The latter, is still supposed to be in process of formation. Observations tending to show the various rates of progressive accumulation of the latter, and the rationale of its deposition under various conditions, would be instructive.

6.—Chemical analysis of the water in the springs and rivers of India during the dry and rainy seasons. From a careful examination of the latter an approximative idea might be obtained of the nature and quantity of calcareous and other matter, annually added from the land to the waters and bed of the ocean.

7.—There are large plateaus of sandstone on the summits of some of the ranges in the Ceded Districts, covered with ripple marks,—the general direction of which, and the slope of the country, show that the current of water that flowed over these beds anterior to their consolidation, must have had a south-easterly direction. I cannot call to mind that ripple marks have yet been noticed on the sandstone formations of India: but it is highly probable they do exist; and it would be desirable to search for them and note their direction, bearing in mind that the course of the great diluvial stream that flowed over these sands and clays, would be at right angles to the general direction of the ripple lines.

8.—From certain appearances near Nellore, Madras, Mavellipuram, and the present mouth of the Cauvery, it is certain that the sea in these particular localities on the Coromandel coast has advanced on and submerged considerable tracts of land; and two cities, according to tradition (at Mavellipuram and the ancient embouchure of the Cauvery), are now covered by the waves. The sea appears to be receding, or, more correctly speaking, the land appears to be rising in these particular localities. It is probable that, as on the Swedish coast, certain parts of the Coromandel coast, instead of participating in the progressive elevation of the land, suffer a lowering of level; while other portions remain stationary. I have observed similar indications of the sea having covered various parts of the Malabar, or western coast, to a considerable distance inland, in the existence of a former bed

of the ocean a few feet under the present surface of the ground, as we find it at Madras. The present town of Bararoor, north of Mangalore, and supposed by Rennell and Robertson to have been the Barace of ancient geographers, and which is now situated two or three miles from the mouth of the river, is traditionally said to have been situated close to the sea-shore, and its port frequented by large ships from all quarters of the globe; extensive tracts of marine sand and pelagic remains, a considerable distance inland, and the discovery of the hull of an antique vessel of considerable dimensions, and of a construction not known to the natives, buried in the earth, several miles inland near Cannanore, corroborate this tradition. Some of the Brahmins do not hesitate to assert that the whole of the coast was raised up from the bed of the ocean for their exclusive use.

Nothing but small native craft can now ascend the river to Bararoor, and its trade in consequence has been greatly diminished. The ancient town and fort of Calicut is said to have stood on a bank, now submerged by the sea, a little to the south of the present site. It would be desirable to mark and register the rocks now, as those on the shores of the Baltic have been done, at various places along both coasts, in order that the respective limits of these supposed undulatory movements may be traced satisfactorily at some future period.

9.—Observations on the terrestrial and marine deposits now accumulating at the estuaries of large rivers and backwaters, particularly in those of the Malabar coast, both as regards the way in which the accumulation takes place, the degree of mixture and relative proportion of the marine and terrestrial deposits, and the quantity annually deposited. Observations on the causes affecting alterations and shifting of the mouths of rivers would also be interesting.

10.—Investigations into the nature of the beautiful dendritic appearances observed between the layers of the laminar limestones and clay-slates of India, and those in the interior of moss stones, mocha stones and agates, usually attributed to metallic infiltration. A specimen of the Talicota limestone from the Rastia's territory exhibited appearances so strongly characteristic of the vegetable kingdom, as to induce me to send it to Dr. Wight, who kindly examined it, and stated his opinion of its being a species of fucus.

11.—Accounts of the geology of India, south of Madras to Cape Comorin.

12.—Boring experiments through the limestone and sandstone formations of Cuddapah and Kurnool, and through the carboniferous strata in the laterite near Quilon and Cannanore, discovered in 1832 by

Colonel Cullen, also through a similar formation at Baypoor near Calicut, and through the strata in favourable situations between these localities, which should be carefully examined for a continuation of the carboniferous bed or basin.

13.—A description of the geognostic position of the fossiliferous strata between Torioor and Womaloor, near Tattan about 10 miles south of the Pachamalley hills, with specimens.

14.—Do. of the magnesite formations of Yedichicolum, and other localities in the valley of the Cauvery.

15.—Do. of the corundum mines, in the same localities, principally at Veralimodos, near Sholasigámany, Cocarambady, in the Permutty taluk; also near Namcul. Mr. Fischer of Salem, informed me that he discovered a fine ruby imbedded in the corundum at Viralimodos, which was valued at forty pagodas. A description of these localities was expected from the able pen of the late lamented Dr. Benza, and it is to be hoped will be published by his executors, if not in print already.

16.—On a recent visit to the beryl mine of Pattaley, in the Kanghyum taluk, near Coimbatoor, I was informed by the natives that the beryl is also dug at a place called Vaniambady, at the northern base of the Neilgherries; farther information on this subject is desirable, as I cannot hear of this gem existing any where in Southern India except in these two localities. It may assist the observer in his search, to recollect that its matrix, both in Siberia and at Pattaley or Poddioor, is the cleavelandite.

17.—A description and specimens of a sulphuriferous soil, stated by the natives to occur in the Wodiapolliam jungle, south of Wolandoorpett, Southern Arcot, covering an extent of low swampy ground. Mr. Fischer, to whom specimens were sent, informed me that the sulphur is seen on the surface after rains in a yellowish crystalline form. He also kindly furnished me with a small quantity of the earth, which is friable and of a brown colour. The Wodiapolliam jungle he describes to be part of a jungly belt that extends, east and west, across the peninsula.

18.—The tracing of the sandstone and fossiliferous beds of Pondicherry, southward of the Gingee river. From the circumstance of specimens having been brought me by the natives, I think that the former, and possibly the latter with which it is associated, extends into the Verdachelum taluk of Sóuth Arcot, in a S. W. direction.

19.—A description of the extent, accompanied by a suite of specimens, of a bed of shell limestone, which I found between Hyderabad, and the city of Beder. This bed may be a continuation of a similar

one discovered by my friend Lieut. Wyndham, at Koolkunda and Digaye, between Muktul and Gulberga. I regret that severe illness prevented my examining these strata as minutely as I wished, and from procuring more satisfactory specimens than those I sent the Society, which are utterly insufficient for the purposes of classification. In both situations the shell limestone occurred at the southern edge of the great overlying trap formation of the Deccan, and considerably indurated; often passing into chert.

20.—An account of the rocks and deposits in the locality near Hingoli, in which the fossils lately discovered there occur. It is stated to have been found in the common dark coloured soil, but most probably has been transported there from some fossiliferous bed in the vicinity.

21.—Description of the magnesite bed in the vicinity of Hoonsoor, in Mysore.

22.—Farther observations on the laterite overlying the basalt, amygdaloid and wacké of the great trap formation of the Deccan.

V.—*A Brief Sketch of the Life and Writings of Father C. J.* Beschi *or* Viramamuni, *translated from the original Tamil.—By* A. Muttusami Pillei, *Manager of the College of Fort St. George and Moonshee to the Tamil translator to Government.*

Preface.

[The following sketch of the life of Father Beschi has been made from my original Tamil work, at the desire of Walter Elliot, Esq. to whom I am also indebted for many useful suggestions and hints regarding the matter of the work. I also feel grateful to the very Rev. Mr. P. E. Moriarty for his kindness in correcting a portion of the translation, and likewise to the Rev. Mr. W. Kelly, for much assistance of the same description.]

Translation.

In 1822, at the instance of Mr. Benjamin Guy Babington, and under the direction of Mr. Richard Clarke, I undertook to prepare a brief history of Father Beschi's life. Mr. Clarke is eminently skilled in both the dialects of the Tamil language, and was justly admired as one of the most distinguished ornaments of the Board of the Madras

Constantine Joseph Beschi

BRITISH MUSEUM
NATURAL HISTORY.

College. Mr. Babington possesses an extensive, and a profound knowledge of Sanscrit and Tamil. Immediately on his arrival in India, he eagerly applied himself to the acquisition of these languages, and made himself familiar with their genius and beauties, by his unremitting study of the historical and scientific works, that have been composed in these dialects. After having submitted to the College an English translation of the Shen Tamil Grammar, written originally in Latin by Father Beschi, he returned to England in possession of many of the works of that ingenious and distinguished writer. Some of these he has printed since his return to Europe, and he has transmitted them to Madras, that the memory of the venerable Father may be perpetuated and honoured in his adopted country. In executing the task, which under such auspices I willingly accepted, I availed myself of the manuscripts, which in 1798 had been prepared on the same subject by Viduvan Saminada Pillei, an excellent Tamil poet, and the author of many Tamil works.

In addition to the assistance derived from this source, I was in possession of many interesting and important facts regarding Father Beschi, which I gleaned during a tour through the south, from traditionary accounts, still preserved among the people.

My journey to the south was undertaken at the desire of Messrs. F. W. Ellis, the then senior member of the College Board, and A. D. Campbell, the present senior member, for the purpose of procuring a collection of Father Beschi's works, and I gladly embrace this opportunity to express my acknowledgment to these gentlemen for having confided to me a commission so honourable, and so congenial to my feelings. In truth, Mr. Campbell and Mr. Ellis are entitled to the gratitude of all, who take an interest in the preservation and spread of the oriental languages. They are the authors of many valuable oriental works. By their example and encouragement they have promoted the study of the native languages, and rescued these from the neglect into which they had fallen after the destruction of the Madura college. No longer sustained by that institution, which had flourished under the patronage of the ancient Pandyan kings, our vernacular languages creeping, if I may use the expression, as the vine without its support, would have rapidly degenerated, and sunk into a state of rudeness, had not the distinguished individuals whom I have just named, by their unremitting exertions, and the zealous co-operation of their colleagues, succeeded in establishing the Madras College, and thrown around it the light of their talents.

Fathers Beschi and Arnold were natives of Italy, and members of the illustrious Society of Jesuits. They received their education in the Roman College, where their learning and virtue attracted the admiration of the reigning Pontiff, who selected them, on account of their eminent qualifications, for the Eastern Missions.

They arrived at Goa in the year 1700. The Reverend Father Arnold proceeded to South Malabar, where he made himself perfect master of the Malayalam and Ariyam languages, in which he composed many admirable and valuable works, both in prose and verse, explanatory of the doctrines of the Christian Religion.

The Reverend Father Beschi was appointed to the south of the peninsula. On his arrival at his mission he applied himself with assiduity to the study of the Sanscrit, Telugu and Tamil languages, of which he became thoroughly master, particularly of the latter. As soon as he had acquired these languages he employed the best part of his time in removing the weeds, which unfortunately began to cover the fountain of the Christian faith; and, in order to preserve its holy purity, he laboured with indefatigable zeal to enlarge and circulate numerous Tamil works, explanatory of that creed, which had been composed by another extraordinary man, the Reverend Father Roberti Nobili. Mr. F. W. Ellis, Asiatic Researches vol. 14, page 58, says:—"I shall close this note by the translation of a passage from a work entitled, "*Tiru-schabeiyin Charítra Postagam,*" or "*Historia Ecclesiastica,*" written in *Tamul* and published by the *Protestant Missionaries,* at *Tranquebar*, in 1799. This passage is from the section relative to the transactions of the *Missionaries* in *India*, from the arrival of the *Portuguese*, at page 238 of the work, and under the year 1607. The work therein alluded to, as having been written in 1729, is by the famous *Jesuit Missionary* Constantio Josepho Beschi, known throughout the South of India for many valuable compositions in the high dialect of the *Tamul*, under the title of the *Vira-Māmuni or Dhairya Nātha-Swāmi.* This extract is from the preface to the *Vēda Viluccam, the Elucidation of the Scriptures.*"

TRANSLATION.

"[1607] At that time Roberti Nobili, called Tatwa-Bodhager, clothing himself in the habit of a Sanyasi, endeavoured to promulgate Christianity in this country. The secretary to the Congregation de Propaganda Fide, wrote in 1676 to Pope Innocent, that Roberti Nobili, although he called himself a Brahman, was not guilty of falsehood*."

* "The fact is that Roberti Nobili uses the word *Brahmana* always in the sense of priest, as indeed it is rendered though not with precision by Sir W. Jones in the Institutes of Menu; thus he calls the high priest of the Jews and his associates *Yúda-Brahmana*, and the father of the church *Bráhma-Vadigal.*"

He is represented with this habit and appearance in a picture in the convent of the 'paulist's at *Rome*, under which is the following inscription,—' "Father Roberti Nobili, a paulist of the city of *Rome*, and of an illustrious family; a godly and learned personage, who laboured to convert the heathens 45 years, eating nothing but rice and vegetables, and died happily at Mylapoor *(St. Thomé* near *Madras)* on the 16th January 1656." 'That which was written at *Yélacúrchi* (the principal residence of Beschi) in 1729 in his praise is as follows:—' "As the resplendent sun runneth his course in the firmament, but alloweth not his radiant face to be seen, so although St. Thomas, one of the twelve disciples of our Lord Jesus, and St. Xavier, far renowned for innumerable miracles, entered and preached the Gospel throughout this country, yet for a long time the darkness thereof was not dissipated. At last, as if the obscurity of the night, that elsewhere lowereth over all, had been dispelled by the rising of the sun, it pleased our Lord to turn his gracious eyes towards this country covered by paganism as by a cloud, and one hundred and twenty-two years past, to send hither orthodox priests to enlighten all souls. Tatwa-Bodhaca Swami, who then appeared steadfast in austere devotion, confirmed in the true faith, and perfect in virtue, was first sent by the Lord, and long resided here, bright as the morning star. Are not his *Cándam* (the *Jyána-bodhaca Cándam*) which, from soundness of religious doctrine, seems as if written in rays of light, and his other works, well known and received as a sun of everlasting brightness that hath never set. From that time to this, innumerable priests, devoted to their duty, have succeeded each other in succession, like an undivided garland."

Father Nobili had taken the title of Roman Brahman and was an incomparable Sanscrit pundit and poet. (His life and writings are about being published in a work, called the Hindoo Christian Observer). Father Beschi's anxiety was to produce abundant fruits on the tree of the Christian faith, which had been planted by St. Thomas the Apostle, and nourished by the zealous labours of St. Francis Xavier. Accordingly he defended the true faith from the attacks of its enemies, who viewed its prospering growth with envy, and exerted all his zeal to preserve it from decay. He spared no pains in composing luminous Tamil works, explaining the Christian faith. The rapid publication of these works, and the examples of all the various species of eloquence with which they abound, have stamped upon them a character of excellence, which every reader of them is anxious to admit. Although they were written above one hundred years ago, their language has undergone no change, not one word has become obsolete or suffered that

variation which the words of living languages constantly undergo. They are therefore entitled to the attention of all.

Father Beschi's next step was to study the works of the several eminent Hindu philosophers, devotees, ascetics, &c., such as those of Tiruvalluvar and others; and, after he had made himself perfectly acquainted with them, he began his ministry with that success which always accompanies a bold and popular eloquence. Instead of wasting his time in merely lopping the branches, he struck at the root of heathenism, and attacked the doctrines and disciplines of the several sects, with a vehemence peculiar to himself, but admirably suited to the temper and taste of the age. Long before his arrival, the Reverend Roberti Nobili composed many works, as above stated, which shook the science and philosophy of heathenism, and laid open to many of the Indians the imposture and absurdity of their established superstitions. Animated with an equal zeal, the Reverend Father Beschi boldly erected the standard of truth, and defended it with an unconquerable intrepidity.

From the time of his arrival in this country, he abstained from the use of flesh, fish, &c., and employed two Tamil youths to dress his food according to the Hindu custom, partaking of it only once in the day. When at home, he wore on his head a velvet cap; the remainder of his dress consisted of a cloth, with a narrow red border, tied round the waist by another cloth of a light purple colour, and of sandals for his feet—his costume was the same as that worn by the Hindu devotees. When abroad, he wore a long gown of light purple colour, with a waist-band of the same colour; on his head was a white turban, covered with a purple cloth, in his hand he carried a handkerchief of the same colour—his ears were adorned with a pair of pearl and ruby ear-rings—his fore-finger with a gold ring. A long cane in his hand, and a pair of slippers on his feet, completed his out-of-door dress. His conveyance was a palankeen, having a tiger's skin for him to sit upon, two persons attended on either side of the palankeen to fan him—a third person carried a purple silk umbrella, surmounted with a golden ball, whilst two others carrying a bunch of peacock's feathers proceeded in front, and whenever he alighted from the palankeen he sat down upon the tiger's skin. In order to preach the gospel with full effect, and to make converts to Christianity amongst the heathens, he made himself perfect master of the Hindu sciences, opinions and prejudices, and conformed to their customs in matters of indifference. In this manner he visited different countries, exposing the fallacies of their doctrine, and the

absurdities of their religious practices. He is much extolled for the triumphs he obtained in the controversial disputes, which often occur amongst the learned in India. He was very liberal in his donations to the poor, and in the erection and repairs of churches. He was assiduous in instructing the youth in different languages and sciences, and in procuring for them situations suitable to their capacity. The first church he erected, was at Conāngooppam Aryanoor, in the district of Paroor,* which then belonged to Mootoosamy Cachirayen, a poligar chieftain. After its completion, Father Beschi proceeded to Mylapoor, and solicited the then bishop of that diocese, to procure for him, from Manilla, an image of the blessed Virgin Mary, in the native dress, with the child Jesus in her arms, according to a model he had drawn for that purpose. The prelate complied with his request, and on its arrival, he performed a devotion of 11 days; and, on the 12th, placed the image in the church which was dedicated to God in the name of the Virgin, Mother of our blessed Redeemer. He founded another church at Tirucavalur,† and dedicated it to the blessed Virgin under the title of Mother of Refuge. It was erected on the land granted to the Christian church, situated at Elacurichy, by Mazhavarāyen. He composed 15 poems in praise of the blessed Virgin Mary.

* Virttachellum talook of South Arcot.

† Insctiption engraved on the stone set on the bank of the tank behind the church at Tirucavālūr, in the talook of Arialoor, Trichinopoly collectorate.

ஸ்வஸ்திஸ்ரீ சாலிவாகன சகாப்தம் - ௲௬௱௫௰௭ - ராக்ஷதவருஷம் ஆடிமீ ௨௰௬௳ ஸ்ரீமதுராசமானிய-ராசஸ்ரீ அரியலூரரசினிலையிட்டரங்கப்பமழவராயர் ஏலாக்குறிச்சித்திருக்காவலூரில்வீரானதேவன் வழிக்குக்கிழக்கு-கோவிலூர் வழிக்குமேற்குக்குட்டைக்குத் தெற்கு-பெரியஏரிக்குவடக்குப்பட்டயாவுஞ்சர்வேசுரன்கோயிலுக்குச் சிலாசாதனமாகத் தந்தோம் - சந்திராதித்தருங் கல்லுங்காவிரியும் புல்லும் பூமியுமுள்ளளவுஞ் சுகமேயிருக்கவும் - இநதத்தருமத்துக்கு யாதாமொருத்தன் விகாதஞ்செய்தால் கங்கைக்கரையிலே காராம் பசுவைக்கொன்ற தோஷத்திலே போகக்கடவான்.

TRANSLATION.

Swasti Sri (may happiness and prosperity attend). In the year Ratchada following the year 1657 of Salivahna (corresponding with A. D. 1734), on the 26th day of Adi-Srimadu, Rāyamāniya Rājestri Rungappa Mazhavarāyer, whose seat of government is fixed in Ariyalur, has caused a stone to be engraved, and granted the whole of the land situated within the limits, from the east of Vīrān dēwan road, to the west of Kovilūr road, and from the south of the pond to the north of Periya Yeri, at Yēla-Curichy Tirucavalūr, for the use of the church of the God of all—to enjoy as long as the sun and moon endure, as well as the stone, the river Cauveri, grass and earth exist; if any one act contrary to this charity, may he incur the sin of killing a black cow on the banks of the Ganges.

Works written in Tamil by Father Beschi—*chiefly intended for the use of the Hindu Christians.*

POEMS.

1.—Tembavani*—In honour of the Lord Jesus, the blessed Virgin and St. Joseph. He produced in 1726, the sacred poem called Tembavani, which is by far the most voluminous of his works. It contains 3615 tetrastichs in thirty cantos. To which he added in 1729, to each verse a prose interpretation. The poem comprehends many religious disquisitions and explanations, descriptive of true religion, together with one hundred and five historical passages, taken from the old and new Testaments. It is a work of such great genius and vast erudition that it is admired by all who read it, not only for the sublimity of the thoughts, and the learning it displays, but also for an elegance and purity of style which, it was imagined, no foreigner could acquire. A talent so felicitous and extraordinary has been ascribed to divine assistance.

The poets unanimously acknowledged Father Beschi as their tutor, and with his own permission bestowed on him a high and well merited distinction. Instead of Dyrianatha Swami, that is Father Constantine, which was the name he had borne since his arrival in India, they substituted, the title of Viramamuni, or the " Great Champion Devotee."

Agreeably to the rules of versification laid down in the grammars, the celebrated Tamil poems called Chintamani and Ramayanam, as well as other Indian poems, contain six kinds of rhymes, and these promiscuously used ; but the Tembavani is composed in the first sort of rhyme† only, a species of versification difficult to be sustained, but greatly admired for its excellence. With respect to the சந்தம் or cadence, Viramāmuni says in the Shen Tamil Grammar, translated by Mr. Babington, " On this principle, it is very easy to invent new சந்தம் or cadences. Those who are unacquainted with this art, applaud the poet Camben, because in his Ramayanam, which contains 12,016 stanzas, he has introduced 87 varieties of cadence : but in my poem Tembavani, which contains only 3,615 stanzas, I have without

* See Ellis's translation of the Cural, pages 17, 23, 25, 35, 45, 50, 88, 100, 101, 141. Vide appendix of this book. See page 3 of the preface to the Adventures of Gooroo Paramārtan, a tale in Tamil, accompanied by a translation of Mr. B. G. Babington, who says " Tembavani, which, vying in length with the Iliad itself, is by far the most celebrated and most voluminous of his works. To judge from the only padalam or canto, which I have had an opportunity of reading, where the murder of innocents is described, its merits are not over-rated."

† Vide Mr. B. G. Babington's Shen Tamil Grammar, page 75. " If not only the second syllable of each line in the stanza, but the whole of the first foot, with the exception of the first letter, be the same, the verse is esteemed, in proportion to the difficulty of the performance. Thus, if, where (கருவி) caruvi occurs in the first line, (குருவி), curuvi (அருவி), aruvi (உருவி) ooruvi, &c. come in the other lines, the verse will be particularly admired.

any difficulty employed 90 such variations. Indeed it would have been easy to give a different cadence to every stanza; but this could not have been done with propriety, as the same cadence is usually preserved through ten, fifteen, or more stanzas."

Mr. Babington on his return to England took with him a copy of the Tembavani in two volumes folio.

When Sir John Malcolm visited the College of Madras in 1817, Mr. Ellis, in shewing him a copy of the Tembavani, written on cadjan, dwelt largely on the merit of that work. Sir John not only expressed his great admiration of the work but also requested that, as Europeans so rarely acquire a perfect knowledge of Indian poetry, or compose poems of such extent and excellence, in any of the eastern languages, Mr. Ellis would procure him a copy of the Tembavani in cadjans, to take with him to England, for the purpose of placing it in Lord Spencer's library. Accordingly a copy of it was made in cadjans, the two boards of which were ornamented with silver and gold. It was transmitted through the Government of Fort St. George, to Sir John Malcolm, when he was Governor of Bombay, by the College Board of Madras.

I am* happy to state that I have the honour of possessing the copy of the Tembavani, written by Father Beschi's own hand.

A specimen of Father Beschi's poem translated by Mr. Ellis, as also the Reverend Mr. E. Hoole's, are added in the appendix, No. 1, at the end of this paper.

2.—Tirucāvalur Calambacam;† 3. Adeikala Mālei, and 4. Calivenba. Father Beschi composed these three poems in honour of the Madonna, to whom the church at Tirucavalur was dedicated.

5.—Annei Azhemgal Andādi. The poem of the sorrowing Mother, or the lamentation of the Mother of our Lord on his crucifixion. It consists of 100 stanzas composed in the measure called Andādi, in which each stanza commences with the same word that terminates the preceding one.

* On my arrival, duriug my journey abovementioned, at a place called Avoor, twenty miles south of Trichinopoly, I found the Tembavani in Beschi's own hand-writing, in possession of Luz Naig, son of Bungaroo Naig, Beschi's disciple. In compliance with my request, Luz Naig brought the book to Madras for the inspection of Mr. Ellis, who purchased the work for 300 rupees. After taking a copy of it for his own use, that gentleman kindly presented it to me. Mr. Josiah Hudleston purchased Mr. Ellis's Tembavani, when his effects were sold by auction.

† Calambacam—a sort of poetry in which the author mixes at pleasure all kinds of verses. This variation in the measure renders the composition pleasing to the ear, but difficult to those who compose or recite it.

6.—Kittēri Ammal Ammānei. An account of the life and martyrdom of the holy Virgin Kitteri, daughter of Sinakāyen, king of Lusistan who suffered with her eight sisters on the mountain of Bomber, in the year 130, A. D. A poem in 1100 couplets, divided into ten parts.

This probably refers to Quiteria or Citheria, a holy Virgin and martyr of Spain. Martyrologium Romanum, p. 130—Calendar 22d May.

Moreover there are numerous fragments of poems in different kinds of rhyme in honour of the Lord Jesus, and the blessed Virgin Mary, &c.

Works written in prose.

7. Vedhiar Ozhuccam. (The following translation of its contents is by the Reverend Mr. E. Hoole, a Wesleyan Missionary). "It contains clear definitions, offers powerful, and presents affecting appeals, with regard to the work of this class of teachers. It is divided into twenty chapters. The first chapter treats of the nature of the office of catechist; the second, of its importance; the third, of its universal obligation; the fourth, of the preparation to the office; the fifth, of the necessity of self government in those who would save others; the sixth, of caring of others in order to self preservation; the seventh chapter shews that the first means for the salvation of others is personal piety; the eighth, the second means is prayer; the ninth, the third means is desire; the tenth chapter presents motives to quicken a desire for the salvation of others; the eleventh treats on self diffidence and entire reliance on God in the execution of the office; the twelfth, on regarding the souls and not the outward condition of men; the thirteenth, on shewing love to others; the fourteenth, on shewing no desire for the wealth of others; the fifteenth, on regarding the proprieties of time and place; the sixteenth, on yielding to others in order to win them; the seventeenth, on not giving way to discouragement from want of success; the eighteenth, on unity among themselves; the nineteenth, on helps to the office of catechist; the twentieth is an exhortation on attention to the instructions. The whole concludes with questions and assistances for self-examination with regard to duty towards God, personal piety, family religion, duty towards ministers, duty towards the church, duty towards the heathen, duty towards dying persons, duty with regard to hindrances in the performance of the office: and a number of pithy proverbs to be fastened on the memory."

8. The Vēdha* Vilaccam, or illustration of religion. (The following translation of the contents of this book is by Mr. E. Hoole). " The first chapter treats of the rise of protestanism ; the second chapter recounts the divisions in the protestant church ; the third defends the worship of saints; the fourth, the worship of the Virgin Mary ; the fifth assert the antiquity of such worship; the sixth defends the worship of images ; the seventh asserts the antiquity of such worship ; the eighth is on the decrees of the church ; the tenth asserts that the Romish church is the only true church ; the eleventh is on purgatory ; the twelfth on the sacraments generally ; the thirteenth, on the sacraments particularly ; the fourteenth, on transubstantiation ; the fifteenth, on the sacrifice of the mass ; the sixteenth, on the holy Scriptures ; the seventeenth, on the miracles of the church ; the eighteenth, confirmation of what had been advanced. The work concludes with a confession of faith on the principles defended in it.

" The book then closes with the particulars of the place, date, and quantity of the composition, and the author's name. It is dated 1728."

9.—Pedagamaruttal—Refuting differences.—This work arose out of the circumstances related in the preceding note, and is a reply to the church history of the Tranquebar missionaries, which, instead of 300 pages as stated by Mr. Hoole, consisted according to Beschi of only 13 pages, and was, probably, a totally different work. A copy of it was sent to them by Beschi, but the controversy does not appear to have proceeded further.

10.—Gnana-Unarttal.—Instructions of wisdom.—Remarkable for the beauty, ornament, and elegance of its language. It commences with the most simple, and gradually ascends to the most elevated style of composition. This book was particularly composed as a guide for the preachers of the Gospel.

11.—Tiruchabei Canidam.—A treatise on astronomy, and designed for the use of the church in fixing the observance of Ash-wednesday, and other festivals. This work is in verse and prose.

* This work was composed by Beschi in consequence of an attempt made by the Danish missionaries to circulate, in the vicinity of Tirookavaloor, where Beschi resided, a translation of the new Testament. The missionaries had deputed a zealous catechist for that purpose, and provided him with a large supply of their own version.

Mr. Hoole says that " the publication of a Church History in Tamil, an octavo volume of more than three hundred pages by the missionaries of Tranquebar, afforded perhaps the most suitable answer this work could receive. I was told at Tranquebar that a copy of that History was sent to Beschi, who never ventured to impugn its statement."

In putting forth this statement, Mr. Hoole does not seem to be aware that the work called Pedagamaruttal, the next on the list, was specially composed on this occasion.

Works written in Tamil and Latin, by Father Beschi, *chiefly intended for the use of the European missionaries, &c.*

12. Low Tamil Grammar in Latin, entitled Grammatica Latino-Tamulica, in qua de vulgari Tamulicæ Linguæ Idiomate கொடுந்தமிழ் dicto, Fusius Tractatur. Auctore P. Constantio Josepho Beschio, E Societate Jesu, et in Regione Madurensi, apud Indos Orientales, Missionario.

This is a complete Grammar of the low, and an excellent key to the high dialect. It contains moreover, in a supplementary chapter, "De variis quotidiano usui præcipue necessariis," a variety of information of the greatest practical utility to those, who, by their situation, are compelled to daily intercousre with the Tamil natives. This Grammar was printed for the first, and I believe, the last time at the Protestant Missionary Press at Tranquebar, in 1738, and from copies of this impression, which is not common, an English translation, which, however, cannot be recommended, has lately been published at the Vepery Press.

The College Board printed Beschi's Low Tamil Grammar in Latin, in 1813.

Shen Tamil Grammar.

The Author's Introduction.—C. J. Beschi—*To the pious Missionaries of the Society of Jesuits, Greeting.*

"When I last year presented you with a grammar of the common dialect of the Tamil language, with the view of aiding your labours as ministers of the gospel, I promised that I would shortly say something respecting the superior dialect; but my time being occupied by more important duties, the work was deferred longer than I had at first expected. Urged, however, by the pressing solicitations of my friends, no longer to delay making public the information which I had amassed by a long and ardent study of the abstruse works of ancient writers, but to communicate the fruit of my labours, I resolved to avail myself of the little leisure which I could spare from more weighty avocations, and freely to impart what it had cost me no inconsiderable pains to acquire. I was further encouraged to the task, by my sense of the very favourable reception which my introduction to the common dialect had universally met with. Let me intreat the same indulgence for the present work. That the study will be one of considerable difficulty, I do not pretend to deny; but the labour will not want its reward. Among the natives themselves, very few can now be found who are masters of the higher dialect. He among them who is acquainted even with its rudiments, is regarded with respect; but should he quote their abstruse works, he is listened to with fixed admiration; what praise, then, would they not bestow on a foreigner, whom they should

find deeply versed in a science which they themselves consider scarcely attainable? They will readily attend to the teaching of one whose learning is the object of their admiration. And as this may evidently lead to the honour of religion, and promote the salvation of those about us, I am satisfied that this consideration alone, operating on zeal like yours, will suffice to excite you to the study of this dialect, notwithstanding the difficulties that attend it.

" But since almost all the Tamil works in this dialect are in verse, I trust you will not deem it improper, if I venture to draw your attention to heathen poets, and to the study of poetry. In former times, St. Jerome was severely censured for having, by the introduction of examples from the poets, sullied the purity of the church with the pollutions of the heathen. St. Jerome, in his learned reply, demonstrates, that the apostle Paul repeatedly cites from the poets, in his epistles, and that the most exemplary among the fathers not only made frequent use of illustrations from the writings of laymen, but that, even by their own poetry, they, far from polluting, embellished the church. These remarks apply with particular force in this country, the natives of which are swayed not so much by reason as by authority; and what have we from their own authors to adduce in aid of truth, except the verses of their poets? For, since all their writings are in verse, they have reduced to metre their rules of art, and even the rudiments of their language: whence, they naturally suppose, that he who does not understand their poetry, is totally ignorant. Moreover, there are excellent works in Tamil poetry on the subject of the divine attributes and the nature of virtue; and if, by producing texts from them, we turn their own weapons against themselves, they will blush not to conform to the precepts of teachers in whom they cannot glory without condemning themselves. If we duly consider what has been said, we shall be satisfied, that, in this country especially, it is highly proper in a minister of the Gospel to read the poets, and to apply himself to the study of poetry.

" The first person who wrote a grammatical treatise on this dialect, and who is therefore considered as its founder, is supposed to have been a devotee named Agattiyan, respecting whom many absurd stories are related. From the circumstance of his dwelling in a mountain called Podiamalei, in the south of the Peninsula, the Tamil language has obtained the name of தென்மொழி, or *Southern,* just as the Grandonic is termed வடமொழி, or *Northern,* from the supposition that it came from the northward. A few of the rules laid down by Agattiyan have been preserved by different authors, but his works are no longer in exist-

ence After his time, the following persons, with many others, composed treatises on this dialect, viz. Palacàyanàr, Ageiyanàr, Nattattanàr, Mayesurer, Cattiyanàr, Avinayanàr, Càkkeippàdinivàr. The works of all these writers have perished, and we know that they existed only by the frequent mention of their names in books which are now extant. One ancient work, written by a person called Tolcăppiyanăr (*ancient author*), is still to be met with; but, from its conciseness, it is so obscure and unintelligible, that a devotee named Pavananti was induced to write on the same subject. His work is denominated *Nannul*, a term that corresponds exactly to the French *belles lettres*, and the Latin *litteræ humaniores*. Although every one is familiar with this title, few have trod even on the threshold of the treatise itself. The author divides his subject into five parts, which are comprised in the following line:—

எழுத்துச்சொற்பொருளியாப்பணி

"1st. எழுத்து—Ezhuttu—*Letters*. This head treats on pronunciation and orthography.

"2d. சொல்—Chol—*Words;* which are composed of letters. This head treats of the noun, the verb, and the other parts of speech.

"3d. பொருள்—Porul—*Matter;* or the mode in which, by uniting words, a discourse is formed. This head treats on amplification, the affections of the mind, &c. It is subdivided into *agapporul*, and *purapporul;* that is to say, into *matter interior* and *exterior*, The former relates to the passions and affections of the mind, which act on man internally; the latter, to things external to man.

"4th. யாப்பு—Yappu—*Versification*. The Tamil writers confine their remarks on this head to the subject of prosody, and say nothing of the art of poetry.

"5th. அணி—Ani—*Embellishment*. This head treats on tropes and figures.

The term *Panjavilaccanam*, which we here used, is the general expression for these five heads.

"Pavananti not having completed his design, his *Nannul* comprises only the two first heads, viz. *Letters* and *Words;* on each of which he has treated at considerable length On his death, a person, named Narccaviraja Nambi, took up the subject, and wrote on the third head, or *matter*. A devotee called Amirdasagaren (sea of nectar), composed a treatise on the fourth head, or *Versificaion*, which he entitled *Carigei;* and lastly, a person named Tandi wrote on the fifth head, or *Embellishment:* his work was called from him *Tandiyalancaram;* the word *alancaram* being the same as *ani*.

"On *Amplification* and *Embellishment,* the third and fifth heads, I shall say nothing; because my readers are already acquainted with the rhetoric of Europe, to which nothing new is added by the Tamil authors. As I have also treated fully on the *Letters* in the grammar of the common Tamil, the remarks which I shall here offer on that subject will be confined to the peculiarities which exist in the superior dialect. This work will, accordingly, be divided into two parts; the first of which will relate to *Letters* and *Words;* the second, to *Versification.* Under the latter head, I shall take occasion to say something respecting the art of Tamil poetry.

"In the course of this work, much will be purposely omitted, either as being not of frequent use, or attainable by a little practice: my object being, merely to explain the first rudiments of the language, and thereby to remove the more prominent obstacles which oppose its attainment.

"I shall frequently adduce examples from the most esteemed authors; with the view, as well of illustrating the rules which I may lay down, as of initiating the student into the practice of the language. As many of these examples will appear without the name of the author being annexed, it becomes necessary to explain, that the Tamil writers do not usually prefix them to their compositions; and although the names of some have been handed down to us by their commentators, yet the number of commentaries which have been written on poetical works, is small; and even in these, the author's name is not always mentioned. For instance, the commentator on the poem *Chintamani* speaks in terms of praise of its author, whom he styles the master of all the learned. He may indeed with justice be called the prince of Tamil poets, but of his name the commentator does not inform us. Nor are we to suppose that the work itself is called after its writer; Chintamani being only an appellation bestowed on the hero of the poem, whose name is Sivagan. In like manner, we learn that the poet so well known under the name of Tiruvalluven, who has left us a work containing 1330 distichs, was of the low tribe of Paraya, but of his real name we are ignorant: for although he had no less than seven commentators, not one of them has mentioned it. *Valluven,* is the appellation by which soothsayers, and learned men of the Paraya tribe are distinguished; and *Tiru* here signifies *divine,* in the sense in which we say *the divine Plato.* Such is the origin of this honorary title, which has now come to be used as the real designation of the person to whom it is applied. Again, we have a collection of moral sentences, worthy of Seneca himself, written by a woman, who, if we may believe tradition, was sister to the last men-

tioned author; but her real name also is unknown, although she is always called *Auviyar*, a title which is appropriated to aged matrons. There is another work which I shall occasionally quote, and the title of which is *Naladiyar*, which contains 400 epigrams on moral subjects. The origin of this name is said to be as follows: eight thousand poets visited the court of a certain prince, who, being a lover of the muses, treated them with kindness, and received them into favour: this excited the envy of the bards who already enjoyed the royal patronage, and in a short time they succeeded so completely in their attempt to prejudice their master against the new comers, that the latter found it necessary to consult their safety by flight; and, without taking leave of their host, decamped in the dead of night. Previous to their departure, each poet wrote a *venba* on a scroll, which he deposited under his pillow. When this was made known, the king, who still listened to the counsels of the envious poets, ordered the scrolls to be collected, and thrown into a river, when 400 of them were observed to ascend, for the space of four feet, *naladi*, against the stream. The king, moved by this miraculous occurrence, directed that these scrolls should be preserved; and they were accordingly formed into a work, which, from the foregoing circumstance, received the name of *Naladiyar*.

" I have now said all that I think necessary by way of introduction to this work. In conclusion, I have only to assure the student, that if he will apply himself to the perusal of the ancient authors, he will find their writings to be by no means undeserving of his attention. Farewell! Ides of September 1730."

14.—The Clavis Humaniorum Tamulica Idiomatis, containing five parts complete, like Tonnul Vilaccam in Tamil. It is in manuscript.

15.—Vāmen Cadei—a Tamil story, with a Latin translation, for the readers of high Tamil. This is not printed.

16.—Paramarta Gooroo Cadei—a tale in the Tamil language, for the readers of the common Tamil. This is translated into English by Mr. Babington, and printed in London, in the year 1822.

17.—A Dictionary Tamil and French.

18.—Do. Portuguese, Latin, and Tamil.

19.—Do. Tamil and Latin.

20. *Antalogium Tamulica. This work of great merit could not be found, notwithstanding my diligent search in many places when I

* I suppose Mr. Ellis means the following book, vide Shen Tamil Grammar, page 103. " If I should hereafter have sufficient leisure, it is my intention to make a collection of these expressions from their best authors, and thus to form a Tamil Parnassus."

was sent to the southern country by Mr. Ellis, with particular direction to find out the work.

21. A Latin translation of the two first parts (Arappal and Porutpal) of the Tiruvalluver Cural.

I am enabled to supply some information regarding this work. In 1816 I was sent by the late Mr. Ellis, and Mr. A. D. Campbell, to the south, to procure useful works for the College. In my search for books of that description, I found amongst several works of merit a Latin translation of the Cural, which I forwarded along with other manuscripts to Mr. Ellis. I beg to add an extract from that gentleman's reply to a letter, which on that occasion I had the honour of addressing him, regarding the translation of the Cural.

"The books have arrived safe and I commend your diligence in collecting them. Viramamuni's commentary on the Tiruvalluver Cural is exceedingly valuable, and you must use all your diligence in completing the copy and in endeavouring to bring the original with you to Madras, so that I may be able to compare them and to complete the correction of the copy. Should it be necessary for you to remain longer to the southward on this account, do so, as it is of great consequence that an entire copy of this excellent work should be procured for the College.

"Be diligent in enquiring after another work of Viramamuni and for any other books that may be of use to the College.

(Signed) Yours F. W. Ellis."

"*Madras, 27th September* 1816."

I further beg to add some particulars which I learned from the sons* of Beschi's catechist, regarding the original copy of the Latin translation of the Cural. There were two original copies of that work—one without, another with the Tamil text of Tiruvalluver. It was not known who wrote the former, but it was supposed to have been written by Beschi, and it is well known to the sons of Beschi's catechist, that the latter was written by the Reverend Father Julius Cæsar Potensa, the immediate successor of Beschi, under whom the said persons were disciples at the church situated in Porthacoody, in the district of Trichinopoly, and they were present when the said work was executed by Father Potensa. The said persons also gave me a small book which is with me still, written by Father Potensa. On my comparing

* Dayiriyam Pillei and Amirda Pillei, who were the sons of Chowrimootoo Pillei, Beschi's catechist, and who gave me much information respecting the life of Beschi, as well as his valuable works, and whom I met at Cariyam Putti, a village which is about midway between Tanjore and Trichinopoly.

the little book with the said Latin translation of the Cural, I found that both had been written by Potensa himself. On my producing both the originals to Mr. Ellis, he was unable to ascertain whether Beschi or Potensa was the translator, as there was no title page to either of the copies, but he was inclined to decide in favour of Potensa, because the manuscript was in his hand-writing. He has therefore merely alluded to this translation as the work of "the Latin Commentator," and intended to have entered more fully into the subject in the preface to his own translation, which unhappily he did not live to finish. The portion translated by Mr. Ellis himself was intended to comprehend the first part only, called அறப்பால் (Arappal) on virtue, containing twenty-four chapters.

In pursuance of this resolution, eighteen chapters of the Cural were translated and exemplified with quotations from the best Tamil authors: of these chapters which he translated, thirteen only were printed and the rest are with me still in manuscript, as Mr. Ellis died before he could finish the task he had undertaken.

Works written in Tamil by Father Beschi, intended for the use of the Hindoos in general.

22. Tonnul Vilaccam is a grammar of the superior dialect of Tamil by Father Beschi. This is not only a complete and copious grammar of the language, but, as an enumeration of its divisions will shew, embraces all that is comprised in the scholastic term *humanities.* Its several divisions are, on Orthography, Etymology, Composition, Prosody, and Rhetoric. This work as originally composed by Beschi, contains the substance of the Tolcapiam, Nannul, and other pre-existent treatises on grammar, &c. As usual the rules are in verse, accompanied by a copious explanatory commentary in prose; perspicuity and arrangement are especially attended to, so that a person moderately skilled in the low Tamil might soon make himself master of this grammar.

All the Tamil grammarians treat of certain rules for this species of writing, distinguished by the titles அகப்பொருள் or சிற்றின்பம்—*Agapporul* or *Sittinbam,* meaning sensual pleasure, and of புறப்பொருள் or படைசேவகம்—*Purapporul* or *Padeisewagum,* signifying military service; instead of which Beschi introduces a new series of compositions under the names of அறம்—(Aram)—virtue; பொருள்—*Porul* —matter; இன்பம்—(Inbum)—pleasure; வீடு—(Vidu)—final bea-

titude, which Father Beschi says in the third part of his Tamil Grammar, are the subjects fit to be treated upon as a guidance for authors.

In composing this work, Father Beschi not only intended to define the rules of grammar more concisely and accurately than the ancient ones, but also by means of it to establish the Christian doctrine, which he considered to be more particularly his duty than any other object. With this laudable intention, Viramamuni has taken a couplet from Tiruvalluver's Cural, and illustrated it by several quotations from the Chintamani and Ramayanam, shewing how much they fall short of the standard assumed by the poet, after which he introduces quotations from scripture, and argues from the purity of their tendency that they must have emanated from divine authority. This is introduced in the third part of Tonnul, where he lays down the rules of logic.

Mr. Ellis has translated the above said couplet, and a part of Father Beschi's illustrations, which I have added in the appendix, No. 2. See Ellis's Cural, page 88.

The Tonnul Vilaccam, was lately printed at Pondicherry by one of the native Tamil christians, but, I am extremely sorry to say, it is quite incorrectly done, because the proof sheets of the work were examined by an illiterate Hindoo, who, without understanding the plan of Father Beschi, made several omissions and useless additions to the work.

23.—The Sadur Agaradi—a dictionary of the superior dialect, likewise composed by Beschi: it in fact consists of four distinct dictionaries—the first, *Peyer*, shews the several meanings of every word—the second, *Porul*, the several words bearing the same meaning—third, *Togei*, shews the subordinate species of the technical and general terms of science and literature, and the fourth, *Todei*, is a rhyming dictionary. This work, compiled from the various dictionaries of the high Tamil, of which there are a great number, is the only one which is entirely arranged in alphabetical order, the words in the others (a few sections excepted, in which the alphabetical form is used from necessity) being collected into general classes, and resembling, therefore, vocabularies rather than dictionaries, except that they are more copious.

This work was printed by the Board of Superintendence for the College of Fort St. George, in the College press, in 1824, and re-printed by the Reverend Mr. J. Smith, a protestant missionary of the London Missionary Society, at the Church Mission press at Madras, in the year 1835.

Father Beschi was distinguished for his piety, benevolence and learning. To the conversion of idolators his principal efforts were directed, and they were uncommonly successful on several occasions. He displayed much skill in solving various subtle questions with which his adversaries endeavoured to ensnare him.

On an occasion when he was making a missionary circuit, he happened to halt in a village named Vythisweram Covil, and during his walk through the place, he approached a pagoda, where he observed a concourse of people, some of whom he interrogated respecting the deity to whom the pagoda was dedicated. They replied that it was dedicated to Vineideerthan, and that the blind, lame, &c., were cured by a pilgrimage to this pagoda: whereupon Viramamuni immediately composed the following verse:—

வாதக்காலாந்தனக்குமைத்துனர்க்குநீரிழிவாம்
போதப்பெருவயிறும்பிள்ளையற்கு-ஓதக்கேள்
வந்தவினைதீர்க்கவழியறியான்வேளூரான்
எந்தவினைதீர்த்தானிவன்.*

He who is afflicted with elephantiasis; his brother-in-law with diabetes, his son with a pot-belly, and, moreover, this same Veloorān, being unacquainted with medicine to cure his own disease, what sickness can be healed by such an one?

The assembled multitude who heard this were astonished at his knowledge of their mythology.

Being desirous of having an audience of Chundah Saib, the Nabob of Trichinopoly, he commenced learning the Hindoostanee and Persian languages, and made himself complete master of them in the short time of three months. On his first visit, Chundah Saib, admiring the rare qualities of this distinguished divine, conferred on him the surname (عصمتي سنياسي) Ismattee Sannyasi, indicating his excellence as a religious devotee, and presented him with a palankeen, inlaid with ivory,

* Vydenada Swamy called Vēloorān, the deity abovementioned under the appellation of Vineideerthan, is represented as afflicted with elephantiasis or an enlargement of one of his legs, his brother-in-law, Vishnu, with diabetes, and his son Pilliar or Ganesa with an enlarged stomach. The words here used have also a double meaning. Vadakkal is "Foot upon dispute," alluding to the attitude in which Siva disputed with Kali, dancing on one foot, as well as elephantiasis. Nirizhivu is "running of water," alluding to the Ganges flowing from Vishnu's foot, as well as the disease.

in which his grand-father, Sadoolah khan, used to ride. The Prince also granted for his maintenance a free-gift of four villages, named Bokalur, Malway, Arasur, and Nullur, in the district of Trichinopoly, north of Coladam, yielding a net revenue of 12,000 Rupees per annum, and appointed him to the office of dewan. Whilst in that office he retained the habit of a religious devotee, and on his circuits assumed all the pomps and pageantry with which Hindoo *gurus* usually travel, along with the civil Mahomedan honours, such as chobdars, horsemen, drums, fifes, caparisoned state horses, hurcarrahs, daloyets, nowbut, tents, &c.

Although he was now engaged in state affairs, and continued his study of the Hindu sciences and the composition of several useful works, yet his principal efforts were then directed to the conversion of idolators, whilst he amused himself in the reading of Tiruvalluver Cural, Naladiar, Chintamani, Ramayanam, and other celebrated Hindoo works.

Viramamuni continued to hold the office of dewan in Trichinopoly, until the year 1740, when that city having been besieged by the Mahrattah army under Nather Sing, and Chunda Saib made prisoner, he proceeded to Manapar, and remained there in the service of the church.

But unfortunately a constitution much broken down by incessant study, and laborious travels in countries whose climates are so prejudicial to European constitutions, particularly to one who led such a life as he did, shortened his life; and consigned him to a world of better existence, where he is no doubt gone to receive the reward of a life well spent in the discharge of those duties, which devolved upon him as a man and a Christian. He died at Manapar in the year 1742.

When all the circumstances of his life are taken into consideration, many will be of opinion that such pomp as has been above described did not proceed from worldly motives. Although some of the Missionaries murmured against such proceedings, men of sense will at once perceive that the Jesuits did not display such worldly splendour to improve their income, or to enable them to support their families, for family they had none, and therefore no one can say that they took pains for such purposes, but purely with a view to get the people of this country to embrace the Christian religion. For this sole purpose then the Jesuits assumed the habit, &c., of the Hindoo priesthood, rejecting animal food to which they were accustomed from their infancy, and living on vegetables and other meagre diet, to which Europeans are

not trained, that the cause of Christ may, even at the risk of their health, and other bodily discomforts, not meet with any obstacle on those scores.

The most valuable Missionary of the Society of Jesus, the Reverend Father Roberti Nobili, perceiving that the high caste people of this country had an aversion to the Christian religion, under an impression that in embracing it they would be lowered in the eyes of their heathen relatives, and the intercourse between them in consequence discontinued, and if discontinued nothing could equal such degradation, he, our Christian champion, spared no pains in discovering a method of removing such impression. He was so far fortunate as to find out that it consisted in the manner of living, and this among the Hindoos was of the most harmless and simple nature, and nowise inconsistent with Christian principles, inasmuch as it required only an innocent change by the Christian preacher of his habit and diet to that of the native priesthood. These, though not contrary to the principles of the gospel, yet being in a worldly point of view both unprofitable and prejudicial to health and comfort, were yet readily assumed by our divines, whereby they had the happiness of bringing over to Christianity, not only many men of high caste, but through their means whole Indian tribes. Under these circumstances it must be evident that the assumption of such habit, &c., was caused purely by an ardent desire of promoting the cause of Christianity, and not to obtain any worldly advantage.

As the Jesuits became thorough masters of the languages of the country, and the authors of admired compositions in it? they were therefore qualified to wear the costume of the priests of the country, and to preach with eloquence and persuasive effect, convincing and delighting the natives themselves in the language of the country. Moreover the books of the Jesuits are read by the Hindoos in general with pleasure, to this day, because they are so elegantly and skilfully adapted for inculcating and recommending the Christian religion.

What prevails as rank among Europeans, may in a manner be compared with the caste of the natives. However, there is a difference between rank and caste; because if any European of high rank associates and eats with a low man of his nation, the former cannot be degraded into or become a man of low rank, as the Europeans have never had any distinction of caste, either before or after they embraced Christianity. The natives are differently situated. If a Brahmin or other high caste native associates and eats with a low caste man of his country, the Brahmin will be considered as having become a low caste man, there being separate sorts of foods for the different castes

of this country. There is no such difference in eatable things among people of high and low rank in Europe.

Although the natives do not associate, nor eat with the low caste people of their own country, yet they consider them as themselves with regard to spiritual concerns. The civil distinction of caste cannot therefore be contrary to the second great commandment of God, as it is not applicable to the associating, eating, &c., but refers to spiritual concerns alone. See 14 chapter, verse 17 of St. Paul's Epistle to the Romans, "For the kingdom of God is not meat and drink." In opposition to this Scripture it is asserted that, a Brahmin, Chatriya, Vaisya, or Sudra cannot become a true Christian unless he associates and eats with them the food served on their table, which has been dressed by Pariahs. Surely this is not in conformity with the Scripture of St. Paul. See verse 15, chapter 14 of St. Paul to the Romans, "But if thy brother be grieved with thy meat, now walkest thou not charitably. Destroy not him with thy meat, for whom Christ died."

If we relinquish the distinction of caste we shall be unable to marry the daughters of our heathen relatives, and we should be unable to indulge the hope of our heathen relations becoming converts to Christianity.

The Jesuits being acquainted with all the practices and customs, as above described, did not interfere with them as long as they were not in themselves sinful, nor connected with the heathenish ceremonies of the country. Yet they were very particular in preventing all sinful acts and superstitious ceremonies, by preaching and publishing numerous works, particularizing in them what might be retained and what ought to be rejected, and peremptorily prohibiting the observance of any thing contrary to Christianity.

In other respects they conformed entirely to the customs of the country, in which they lived, according to the example of St. Paul, 1st Cor. 9, 20. "To the Jews I became as a Jew that I might gain the Jews, &c." so the Jesuits assumed the title and appearance of Brahmins to gain the Brahmins. Moreover they abstained from the use of animal food, and lived on rice and vegetables according to the customs observed by the high caste people of this country, for they did not care to pamper their bodies. See St. Paul's 1st Epistle to the Corinthians, chapter 8, ver. 13. "Wherefore, if meat make my brother to offend, I will eat no flesh while the world standeth, lest I make my brother to offend."

Appendix No. 1—*Specimen of Father* BESCHI'S *Poem, quoted by Mr.* ELLIS *in his translation of the Cural; together with some few additional translations of the same poem from my late publication entitled the Padigam.*

ON THE ATTRIBUTES OF GOD.

Vide Ellis's Cural, page 23.

Vira-mamuni, by which title the Rev. C. J. Beschi is best known as a Tamil author, in the 27th book, ஞாபகப்படலம், of his epic poem the Tembavani, commencing with the 156th and ending with the 163d verse, introduces Joseph, the husband of St. Mary, explaining the attributes of the Deity: of these I shall quote only the two first, as the remaining six contain merely the separate illustration of each attribute, of which a shorter and, therefore, more perspicuous explanation will be given from another work. To each verse of this poem the author has added a prosaic gloss, frequently expanding into a comment, from which, as affording a fuller view of the subject than the text, the translation is made.

ஈறிலநன்மைநிறைவுமோர்குறைமுற்
றின்மையுந்தொழத்தகுந்தெய்வ
மாறிலவியல்பேவேரிதாய்க்கிளைத்து
வரும்பலவினையென நூலோர்
ஆறிலக்கணங்களுரைத்தவையுள்ளோ
னுண்டகையிலனலனென்றார்
தாறிலசுடரைமைவரிந்தன்ன
சாற்றுதும்புன்சொலாலவையே.

மட்டின்றியெல்லா நன்மைநிறைவு மெல்லாக் குறையின்மையு மென்றிவ்விரண்டேயெவரும் வணங்கத்தகு மெய்க்கடவுட்குரிய மாறாதகுணந்தாமே - இதுவேராகக்கொண்டு கிளைத்தபலகொம்புக ளின்றன்மையாவிக்குணத்தைவிரித்து நூலோர் மெய்யானதேவனை யறிவதற்காறிலக்கணங்களைச் சொல்லி யவையெலாமுடையோன் றேவனேயென்று ரவற்றுளொன்றாயினுங்குறைந் தெல்லாவற்றையு மில்லாதவன்றேவனல்லனென்றார் ஆகையாலளவிறந்தகதிருள சூரி யனைமையாலெழுதினாற்போல நானுமென்புன்சொல்லாலத்தேவா றிலக்கணங்களைச்சொல்லிக் காட்டுவேனென்றான் சூசையென்க.

தன்வயத்தாதன்முதலிலனாதல்
தரும்பொறியுருவிலனாதல்
மன்வயத்தெல்லாநலமுளநாதல்
வயின்றொறும்வியாபகனாதல்
பின்வயத்தின்றியொருங்குடனனைத்தும்

பிறப்பித்தகாரணனாதல்
பொன்வயத்தொளிர்வான்முதலெலாவுலகும்
போற்றுமெய்யிறைமையினிலையே.

தன்னாலாதலுந் தொடக்கமின்றியாதலுமைம்பொறிக்குரியவுரு வில்னாதலு நிலைபெற்றசகலநன்மையுளனாதலு மெங்கும்வியாபக னாதலுந் தன்னையல்லாதோருதவியின்றி யெல்லாவற்றையு மொரு ங்குடன்படைத்த வாதிகாரணனாதலு மென்றிவ்வாறிலக்கணங்கள் பொன்னொளிர்வானுலகுமுதலெவ்வுலகும் வணங்கத்தகுமெய்க்கட வுளின் றேவதத்துவமிதேயென்றனென்க.

Infinite goodness extending to all and the absolute deprivation of all defect, these two are the appropriate and unvarying attributes of the true God, worthy to be adored by all. From this root the six attributes by which the wise have endeavoured to convey a knowledge of the true God have arisen like branches; they say that he who possesses all these is God, but that he who is deficient in one must, also, be deficient in the rest and, consequently, not God. Therefore, said Joseph, even as they attempt to depict in ink the sun with unnumbered beams, will I in language all inadequate endeavour to explain the six attributes of the Deity.

Existing by himself; existing without beginning; existing independently of the organs of sense; being possessed of everlasting and universal goodness; pervading all space; being the first cause by which all things were created at once and without assistance:—these six attributes describe the divine nature of the true God, worthy to be adored in the heavens, shining like gold, and in all worlds.

These *six* attributes, expressed in the same terms, are, also, found under the word குணம்-௬ in the Togei-yagaradi or third division of Vira-mamuni's Sadur-agaradi, or dictionary of the high Tamil in four parts, and they are, also, enumerated in the commentary on the following couplet, which contains the invocation prefixed to the part treating on prosody in his grammar of the high Tamil, entitled Tonnul-Vilaccam.

யாப்புறநலமெலாமிணைந்தவோர்சட்குணன்
காப்புறவடிதொழீஇக்காட்டுதும்யாப்பே.

Having, to obtain his aid, worshipped the feet of the only God, who united with all good, possesseth the six attributes, I proceed to explain the rules of prosody.

PRAISE OF GOD.

As a further exemplification of the success with which Vira-mamuni has imitated, not merely the expression, but the modes of thought of the previous Tamil writers, the following stanzas are selected from the

Tembavani. In the poem which is added, though by no means intended to emulate this author in perfection of language, a similar imitation of the style of these writers has been attempted; with what success the reader will judge—

அறக்கடனீயேயருட்கடனீயே
யருங்கருணாகரனீயே
திறக்கடனீயேதிருக்கடனீயே
திருந்துளமொளிபடஞான
நிறக்கடனீயேநிகர்கடந்துலகின்
னிலையுநீயுயிருநீநிலைநான்
பெறக்கடனீயேதாயுநீயெனக்குப்
பிதாவுநீயனைத்துநீயன்றே.
கார்த்திரள்மறையாக்கடலினுண்மூழ்காக்
கடையிலாதொளிர்பரஞ்சுடரோ
நீர்த்திரள்சுருட்டிமாறலையின்றி
நிலைபெறுஞ்செல்வநற்கடலே
போர்த்திரள்பொருதக்கதுவிடாவரணே
பூவனந்தாங்கியபொறையே
சூர்த்திரள்பயக்குநோய்த்திரள்துடைத்துத்
துகடுடைத்துயிர்தரும்முதே.

Thou art the sea of virtue, thou art the sea of grace, thou art the most benevolent,

Thou art the sea of power, thou art the sea of prosperity, thou art the sea of wisdom which enlighteneth the mind;

Thou art the confirmation and the life of the world, to whom is no likeness;

Thou art the sea by which I am confirmed, thou art to me as a mother and father; art thou not all to me?

Thou art the infinitely bright and heavenly sun, which cannot be hidden by the assembled clouds and which sinketh not into the ocean;

Thou art the sea of constant felicity which hath neither swell nor wave;

Thou art an impregnable castle which no foe hath ever taken; thou art the mountain which supporteth the earth;

Thou art the life-giving nectar which cureth all distemper, allayeth all pain and removeth all defect.

தேறுந்தயையின்முனிவோய்நீசினத்திற்கருள்செய்கனிவோய்நீ
கூறுங்கலையற்றுணர்வோய்நீகூறுந்தொனியற்றுரைப்போய்நீ
மாறும்பொருள்யாவினுநின்றேமாறுநிலைகொள்மரபோய்நீ [யோ.
யீறுந்தவிர்ந்துன் புகழ்க்கடலாழ்ந் தெனக்கேகரைகாட் டருளா
ஒளிநாக்கொடுவான்சுடர்புகழவொளிநாக்கொடுபன்மணிபுகழக்
களிநாக்கொடுபற்புள்புகழக்கமழ்நாக்கொடுகாமலர்புகழத்
தெளிநாக்கொடுநீர்ப்புனல்புகழத்தினமேபுகழப்படுவோய்நீ
அளிநாக்கொடுநானுனைப்புகழவறியாமூகையுணர்த்தாயோ.

O thou who in thy protecting kindness art angry and in anger delighteth in mercy!

O thou who without instruction knowest all things and sayest all things without a voice!

O thou who in the midst of all things changeable art by thy nature unchangeable!

Wilt thou not vouchsafe to shew the shore to me who am sunk in the everlasting ocean of thy praise?

The resplendent beings of heaven praise thee by their tongues of light;

The various birds praise thee by the tongue of joy; the flowers of the grove praise thee by the tongue of fragrance;

The waters praise thee by the tongue of transparency, O thou who art praised for ever!

Wilt thou not teach me, the ignorant and the dumb, to praise thee by the tongue of love?

மருடருவலியுருவே மருளறுசினவுருவே
யருடருதயையுருவே யளவறுதிருவுருவே
தெருடருகலையுருவே செயிரறுமனுவுருவே
பொருடருமணியுருவே பொழிமணவடிதொழுதேன்.
உரையிலகலைநிலையே யுயரறமடையுரையே
கரையிலபடர்கடலே கதியுயிர்பெறுகரையே
வரையிலசுகநிலையே வளர்தவமடைவரையே
புரையிலமனுமகனே புதிமலரடிதொழுதேன்.
மருமலிமலர்நிழலே மறைமலியுயர்பயனே
திருமலிகரமுகிலே சிவமலிதனிமுதலே
யிருமலியுலகுளரோ யிணையொடுதொழுமடியே
குருமலியறநெறியே கொழுமலரடிதொழுதேன்.

O thou who hast the power to cause dread, but art not disturbed by thine anger! O thou by whose mercy grace is vouchsafed and unnum-

bered blessings are conferred! O thou who art the knowledge which giveth understanding, who in the human form destroyedst sin! who art a precious jewel set in gold! I worship thy feet diffusing fragrance.

O thou who possesseth knowledge not conveyed by words and art the word by which the highest virtue is conferred! O thou who art a broad ocean without a shore and the shore attained by beatified spirits! O thou who art eternal happiness without limit and the limit to be attained only by unceasing devotion! O thou, the Son of man without an equal, I worship the newly blown flower of thy feet!

O thou whose protecting grace resembleth the shade of fragrant flowers, who art the exalted sense of the scripture, whose hand, bounteous as the clouds, dispenseth felicity, who art alone the cause of salvation, whose feet those dwelling in the two worlds adore and adorn with flowers, who art both the teacher and the path of virtue, I worship the blooming flower of thy feet!

THE DESCRIPTION OF THE COUNTRY OF JUDEA.

*On the Cloud and Rain.**

புள்ளுலாம்விசும்பிடைதொறும்பொரும்படைபொருவ
வெள்ளுலாமழைவெண்கொடியுருக்கொடுவிளங்கித்
தெள்ளுலாந்திரைதிளைப்பவுண்டெழுந்துயர்பரந்து
வள்ளுலாங்கருமதகரியினமெனத்தோன்ற.
போர்புறங்கொடுபொருந்தலருரத்திறேய்த்தொளிர்வேற்
சீர்புறங்கொடுதிசைதொறுமிருளறமின்னி
வார்புறங்கொடுவளர்முரசொலியெனவதிர்ந்து
நீர்புறங்கொடுநீண்முகின்முழங்கினமாதோ.
படையெனச்செருப்பகைதரப்படர்ந்தனவல்லாற்
கடையெனச்செறிகருணையோடூற்றியவள்ளற்
கொடையெனச்செழுங்குன்றொடுவயின்றொறுங்குளிர
மிடையெனச்சொரிவியன்முகில்வரைவில்பொழிய.

As in an army arrayed for battle, over all the sky, where the birds rove, white clouds appear resembling white banners; but, having filled themselves with the clear waves of the ocean, they spread abroad and seem like a mighty herd of black and furious elephants.

Like bright spears glancing from the breasts of enemies in the field

* It is an invariable rule in the Tamil language, after the invocation, and the statement of the subject, to open a poem with a description of the hero's country, and of the capital where he is supposed to have reigned or flourished; and these are represented in the most favourable colours; not such as they are believed to have been, but such as the poet chooses to describe them. In this description, the rains which descend in the mountains, the streams which flow from them, and the consequent fertility of the country, never fail to have their place. Vide page 112, Shen Tamil Grammar.

of battle, they darted their lightnings dissipating darkness in every quarter and, trembling as it were by the reverberating sound of leather-bound cymbols, the black and watery clouds thundered aloud.

Though at first taking the appearance of an army prepared for horrid battle, at length, as the liberal minded bestow their gifts, diffusing coldness over the mountains and the whole expanse of the earth, the extended clouds poured down abundant rain.

ON THE STREAMS.

படித்தநூல்வைபயன்படவிரித்துரைப்பவர்போ
றடித்தநீன்முகிறவழ்தலைப்பொலிந்தபொன்மலையே
குடித்தநீரொலாங் கொப்புளித்தமுதெனவருவி
யிடித்தருவொலியெழத்திரையெறிந்துருண்டிரிய.
அஞ்சிலாவெதிரடுக்கியகல்லெலாங்கடந்தே
எஞ்சிலாவெழிலிமைத்தநீண்மருதமுநீக்கித்
துஞ்சிலாநதிதொடர்ந்தகல்கருங்கடனேக்கல்
விஞ்சையாரொலாம்வெறுத்துவீடிவறியபோன்றே.

From Padigam.

நிறைதவிர்ந்துணர்ந்தகாமநெறியிற்கைப்பொருளேபோன்றும்
முறைதவிர்ந்தடைசீர்போன்றும்முனிகடம்முனிவுபோன்றும்
பொறைதவிர்ந்திழிந்தீண்டோடும்புன்னலெதிர்கொண்டாங்கத்
துறைதவிர்ந்திடத்திட்டேகித்துளித்ததேன்முல்லைசேர்ந்தார்.
பொய்செலச்செல்லும்வாயிற்பொலிவொடுபெருகும்போல
மைசெலச்செல்லும்வாரிமருளிவந்தளவிற்பொங்கி
மெய்செலச்செல்லும்நன்றெத்தெங்கணும்விளைவுய்த்தோடிப்
பைசெலச்செல்லும்நாகப்பரிசெனச்செல்லுமாறே.

Like those, who, for the benefit of others, teach the learning they have acquired, the mountains abounding in gold, whose summits are embraced by the clouds, cast forth all the water they had imbibed and the nectarean stream, murmuring incessantly, rolled on its swelling waves.

The streams passed boldly all the rocks that opposed their passage and, leaving the far-extended tract of cultivated land, bright with exhaustless wealth, without stay flowed towards the azure ocean ; as the wise, who, renounciug all, aspire alone to obtain heaven.

The following two streams of the rivers are said to have been crossed by the holy family on their journey from Bethlehem to Jerusalem; and from Jerusalem to Egypt.

They (the holy family) met with a stream which descends from the mountains as speedily as the anger of the holy men is appeased—or, with velocity similar to that with which the wealth of those, who, having forsaken that which is right, abandon themselves to unlawful desires, is dissipated ;—or, to that with which unlawfully-acquired gains are consum-

*ed,—and having crossed the current and turned to the right, they arrived at the land of * Mullei flowing with honey.*

The river pursued its course, increasing in its progress by supplies from different streams swollen by the rains discharged from the passing teeming clouds,—as lies are exaggerated by different fabricators who happen to communicate them in succession,—entering the different vegetable creations,—like truth which carries happy effects in its progress, and winding like a hooded serpent coming on its way.

OPERATION OF CULTIVATION.

From Padigam.

செறியுலாம்புனல்சிறைசெய்துபயன்படவொதுக்கி
வெறியுலாமலர்மிடைந்தகல்வயல்வழிவிடுவார்
பொறியுலாம்வழிபோக்கிலதியல்படவடக்கி
நெறியுலாவறநேரவைநிறுத்தினர்போன்றே.
உவர்க்குந்தாழ்கடலுடுத்தகல்விரிதலைஞால
மெவர்க்குந்தாயெனவெண்ணிலாக்கிழிப்படக்கிறு
மவர்க்குந்தானுணவளித்தலேநோய்செய்வார்க்குதவி
தவர்க்குந்தாவருந்தரும்மென்றியற்றுதல்போன்றே.
கூர்விளைத்தருட்குருவிதிபோன்றென்றுகோடி
நீர்விளைத்தநெல்நிரம்பெனவித்தினரிரட்ட
வேர்விளைத்தபற்கடைசியர்குரவையாடியல்பாற்
றேர்விளைத்தவோர்சிறப்பெழும்விழாவணிபோன்றே.
நோக்கவின்புளநுகரவொண்முளரியோடாம்ப
னீக்கலாதெலாநீர்மலர்களையெனக்கட்ட
லாக்கமாக்கினுமறனிழந்தாவதுகேடென்
றாக்கமாண்பினொருங்கவையொழிக்குதல்போன்றே.
பூரியார்திருப்போறலைபசியகூழ்நிறுவி
நீரினார்தலைநேரநேர்வளைவொடுபழுத்த
வாரமானுநெல்லறுத்தரிகொண்டுபோயங்கட்
போரிதாமெனக்களித்தனர்போர்பல்புனைவார்.
மெய்கலந்தபொய்விலக்கிமெய்கொள்பவர்வினைபோல்
வைகலந்தநெல்பகட்டினாற்றெழித்துவைமறுத்துக்
கைகலந்தடுத்தேற்குநர்க்களித்தபின்களித்துத்
துய்கலந்தநெல்லுண்கவுமீகவுந்தொகுப்பார்.

* Land in India is divided into five kinds, 1st குறிஞ்சி (Kuringee) mountain or mountainous land. 2nd பாலை (Palei) parched or desert land without water. 3rd முல்லை (Mullei) forest or pasture and shrubby land. 4th மருதம் (Marudam) well watered or wet land, fitted for cultivation. 5th நெய்தல் (Neydal) maritime land, or bordering on the sea.

In the Tamil grammars are described the different tribes of men, the different species of animals, birds, trees, flowers, and produce, &c., peculiar to each kind of the said lands.

THE HUSBANDMEN ARRESTING THE STREAMS.

The people arresting the full stream and turning it to advantage, conducted it to the broad field, abounding in fragrant flowers; as, restraining the five organs of sense from their own ways, the wise confine them to path of virtue.

Ploughing.

The extensive earth girt by the deep and salt ocean, supplies with aliment even these ungrateful children who tear and rend her bosom and thus performs an act of charity which is rare even among the penitents who do good to those that hurt them.

Sowing.

The doctrine inculcated by a merciful priest is promulgated after the fashion of the song sung by sowers accompanied with the dancing of the pretty village girls resembling the car drawn festival, viz.—may a grain of paddy nourished by water produce hundred millions of grains.

Weeding.

As the lotus, lily and other water flowers, though beautiful to behold are plucked out as weeds, so sages eschew matters, though productive of benefit, if not virtuous.

Reaping.

The green corn erects its new born stem like the mean suddenly possessed of wealth, but bends its full and ripened head like men of real merit. The husbandmen having cut the sheaves of paddy resembling pearls, collects them into heaps.

Sorting.

Like those who embrace truth avoiding the lies which are mingled with it, husbandmen separate the paddy from the straw by buffaloes, and store up the pure grains, partly for their own livelihood, and partly for the poor who wait for charity.

This is the translation of a choriambic stanza by Vira-mamuni, which, though professedly describing Italy, is entirely in the manner of the Tamil poets and in every respect appropriate to their climate; it forms the example for the construction of the species of verse called calippa, in the fourth part of the Tonnul, *on Prosody.*

(வெண்கலிப்பா.)

சென்றுகநீர்பொழியச்செல்வநிலைக்கறமுமிகப்
பொன்றுகநீர்புளையப்புவனமெல்லாம்புரந்தாண்டே
கருமேவும்வளைதவழுங்கமழ்வயற்பாய்பூந்தடஞ்சூழ்
மருமேவுநிழற்சோலைமயின்மேவிக்களித்தாடக்
கரும்பொப்பச்செஞ்சாலி காய்த்தலர்க்கைக்கடைச்சியரோ

சுரும்பொப்பச்சூழிரப்போர்துதித்துவப்பவீந்தீந்து
மாலைதாழ்குழலசையமணக்குரவையொலித்தாட
ஆலைதாழ்புனலொழுகியலர்வனமுங்கனிபொழிலும்
மல்கிவளர்சிறப்போங்கவளையாச்சீர்மனம்வெறுப்ப
நல்கிவளரீத்தலநன்னாடு.

Here pour the waters from the clouds of heaven,
Diffusing wealth and virtue through the land,
Whose wide dominion, like the ambient sky,
Spread its protecting influence o'er the earth.
To fragrant fields, where creeps the pregnant conch,
From flowery lakes the full stream flows; the while
The peafowl dances neath the verdant shade
Of sweetly scented groves. The ripened rice
Overtops the cane and flowery-fingered girls
With liberal hand to all the poor, who swarm
Like bees around, distribute many a sheaf,
And, while their hair by odorous wreaths adorned
Floats loosely in the breeze, join in the dance
As at a marriage feast, their nimble feet
Accordant to their sounding hands. And here
The luscious juice flows from the cane compressed;
Unnumbered flowerets scent the ambient air;
Unnumbered trees their racy fruits afford.
The various produce of the plenteous field
And boundless wealth that satiates the mind,
Thus yieldeth Italy, delightful land!

On Devotees of the Christian Religion.

The Hindus, however, among whom it originated, have carried their ideas of the "Divine Philosophy" farther than others, as they require, not merely the relinquishment of every selfish attachment, but the utter annihilation of self: even this is not considered by Viramamuni, as inconsistent with doctrines of his own Church, as the following extracts, in which occur the every expressions used in the last quotation, will evince.

பவமேபழித்துப்பூவனத்திற்படர்ந்தவணங்கிற்றுயிர்காத்துத்
துவமேநயனைப்பயத்துய்க்குந் துணையேதென்னின்மன்னுயிர்க்கிங்
கவமேதுயர்செய்நானெனதென்றுயவிருபற்றினிதறுக்குந்
தவமேயுயிர்க்கோர்துணையென்றன்றவத்தின்பவ்வக்கரைகண்டான்

மெய்த்துணையிழுக்கெனத்துறவின்மேன்மையோர்
பொய்த்துணையென்றுதம்பொறிகள்போழ்குவா
ரத்துணைக்கடிந்தபின்னனையர்மற்றிவ
ணெத்துணைக்கொள்பவரொன்னவோதுதீர்.
தான்றனதென்றிருதகுதிப்பற்றலு
நோன்றனவடற்கொடுநூக்கிவானுயர்
கோன்றனதருணிலைசார்ந்தகொள்கையி
லான்றனமதுகைமூவுலகுமாட்டுமே.

When the means are sought by which, forsaking sin, the soul may be protected from the evils spread through the world and everlasting happiness may be obtained; it will be found that devotion, by cutting off the two affections, expressed by the terms I and MINE, *by which immortal souls are here vainly disturbed, is the sole cause of their salvation: thus said Joseph, who had beheld the shore of the ocean of devotion.*

Those who have attained the eminence of devotion and, despising, as illusive, the aid of the body, have annihilated their sensitive organs; after they have thus rejected with disgust corporeal aid, say what further aid they require in this world?

His power, who by the force of devotion has annihilated the two affections, expressed by the terms HIMSELF *and* HIS OWN, *supported by the protecting grace of the most High, the King of heaven, is sufficient to shake the three worlds.*

The first of the succeeding verses is an amplification of the thought in the former part of this couplet, the author having judiciously avoided the incongruous figure with which it concludes. This extract is from the thirtieth canto (Meetchi padalam) of the Tembavani; in which, while the holy family are crossing the desert, on their return from Egypt, the Saviour is represented as enumerating in prophecy the several devotees, who in succeeding times are there to devote themselves to austerities and by their example to introduce monastic discipline into the Church. The primitive ascetics Paul, Anthony and Hilarion are first mentioned, but of the many names that follow few can be recognized, as they are either translated into Tamil or altered so as to conform to the orthography of that language. *Ejesia Mariyal*, celebrated in the concluding verses of the extract is St. Mary the Egyptian, the first female recluse on record in the Christian Church: she was discovered by St. Zosimus in the desert beyond Jordan, where she had passed forty-seven years in the simple attire to which the poet with such delicacy alludes.

அவாவெனமதத்தின்சீற்றத்தறிவெனப்பாகன்வீழ்த்த
வுவாவெனவுடலைக்கைக்கொண்டுக்கநற்றேட்டிமாற்றி
யிவாவனதவக்கவட்டையிட்டிருவிரதத்தூணின்
மவாவனமுனிவன்சேர்த்திவானமும்வியவச்செய்வான்.
வீட்டருநாட்டிற்கேற்றவிழுப்பொருளாகநாடி
யீட்டருஞ்சீலக்குப்பையையேற்றிநல்லுயிரோடியாக்கைப்
பூட்டருமேராய்ப்பூட்டிப்புரைநசைச்சேற்றுட்செல்லா
வாட்டருந்தவத்தின்பண்டிமதித்தகன்கதியிற்சேர்ப்பான்.
தேனிமிர்முல்லையாகத்திருந்தறந்தொகுதிநட்டு
நானிமிர்தவத்திற்காத்தநெறிப்பொறிவேலிகோலி
மேனிமிரொழுக்கநீரைவிட்டருண்மணலைப்பாய்த்தி
வானிமிருலகினுறும்வனத்தினுஞ்சோரன்பூப்பான்.
ஆற்றியதவச்செந்தீயிலைம்பொறியிரும்பிட்டூதி
யேற்றியதெருளின்ஞானவிரதமிட்டாயபைம்பொன்
றேற்றியமறையர்சாகச்சீலநன்மணிகள்சேர்த்திப்
போற்றியதேவமார்பிற்புரோதரணிப்பூணுவான்.
தீயவுநலவுமுள்ளிற்றேறியபெண்ணிற்றேற
லாயவுமரிதேமுன்னரழிந்தநாண்வேலிதாவி
யேயவுங்காமத்தாழ்ந்தவெசிசியமரியாள்பின்னர்
தூயவுமரிதிலோர்ந்துதுறந்திவணெடுநாணிற்பாள்.
கண்மையின்மற்றியாருங்கண்டதன்பிழைகாண்யாரார்
நுண்மையினுற்றபாவநுதலியுட்டானேகண்ட
வுண்மையினுணர்ந்தவூக்கமுளத்திறகாகவெய்திப் [ள்.
பெண்மையின்போர்வைநாணம் பிரிவிலள்போர்த்துநோற்பா
காமமேபறவைத்தேர்மேற்கசடனும்பாலைசேர்ந்தாள்
வீமமேபறவைத்தேர்மேல்விளைதவக்குறிஞ்சிஞான
வாமமேபறவைத்தேர்மேல்வளரறமுல்லைசேர்ந்தென்
றூமமேபறவைதேர்மேனயபபவாறுட்டைச்சேர்வாள்.

When by the outragious fury, of the passions the driver had fallen from his seat, Mavavana muni, having seized and mounted the elephant, which is the body; governing him by the strong hook of resolution, he will bind him to the pillar of constancy by the rope of penance, and fill all heaven with admiration.

Desirous of obtaining the wealth peculiar to the kingdom of heaven, Madittagen having heaped on the car of unceasing penitence a load of holiness and yoked to it, as oxen, his body and soul, avoiding the quagmire of sinful desire, he will arrive at salvation.

Having planted the honey-dropping jasmin-vine of perfect virtue; having surrounded it with a hedge of subdued senses, to protect it by

penance supported by religion; having let in the water of strict discipline and spread around it the sand of grace, Asoren will flourish as a garden whose fragrance reacheth to heaven.

Blowing the red furnance of penance and placing therein the iron of the five senses, adding the mercury of bright wisdom, Purodaren poured the pure gold thus obtained into the mould of religion and, having enchased it with precious jewels of virtue, he became an ornament for the breast of the God he adored.

Though women may inwardly resolve on good or bad it is difficult for them to persist in their resolution; thus, though the Egyptian Mary, overleaping the fence of modesty, had at first plunged into the sea of carnal desire, yet at last, having determined to perform austerities with the purest devotion, she will retire from the world and long remain here.

The eye perceives not the colour by which it is darkened, and who are they who see their own faults apparent to all others? but she remembering of herself her minutest sins and borne on the wings of mental resolution, produced by reflecting on the truth she perceived, gave herself up to devotion covered only by the mantel of female modesty.

On the flying chariot of desire she arrived at the desert of sin; on the flying chariot of fear she repaired to the mountains of penitence; on the flying chariot of resplendent wisdom she entered the grove of growing virtue; and on the flying chariot of my name she shall enter the kingdom of heaven.

வீடுறவேண்டினீவிதித்தநூல்லாற்
காடுறவொளிக்குதல்கயங்குளிக்குதல்
நீடுறவிழுச்சடைநீட்டன்மற்றவை
யீடுறப்பயனிலாவெளிறிதாமென்பார்.
சடைவளருருக்கொடுதவிர்கினீர்குளித்
தடைவளர்வனத்திடையகன்றிலாத்திரிந்
திடைவளர்கனிகளோடிளங்கிழங்குணும்
முடைவளர்கரடிகள்முனிவரோவென்பார்.

சுரத்திடைத்தழலொடுதுறும்புருக்களு
மரத்திடைத்தூங்கிநற்கனியுண்வாவலு
முரத்திடைத்துறவரோவுளத்தின்மாண்பலாற்
பரத்திடைக்கிளர்வினைபரியுமோவென்பார்.
செம்பொறிச்சினத்தபோர்ச்செறுநர்க்கஞ்சலாற்
பைம்பொறியெயிலின்வாய்ப்படியப்பூட்டியுள்
வெம்பொறியெழத்தமைவெட்டிவீழ்த்தெரு
வைம்பொறியடக்கியுள்ளவாக்கொண்டாலென்பார்.

On the false Devotees.

If, said the devotees, everlasting happiness be desired, it may be obtained by the rule thou hast propounded and not by seclusion in the wilderness, bathing in fountains, or cherishing long locks of tangled hair, for these and similar acts cannot produce eminent virtue; all this is utter ignorance.

Will they call the rank bears devotees because their bodies nourish tangled hair and they fail not to bathe in water, or because they unceasingly wander through the leafy woods, or because they feed on the fruits and tender roots therein produced?

Will they call the doves that rove amid the heat of the parched desert, or the bats hanging from the trees and feeding on their choicest fruit, the greatest of devotees; how without purity of mind can the sins formerly committed be cleared away?

As one, who, after having firmly fastened the gates of the threatening battlements, from fear of an invading enemy enflamed by rage, urged by his own innate fury stabs himself and dies; so is he, who, although he restrains the five outward organs of sense, is ruled by inward passion.

A Controversy between the Domestic Life and Retirement.

In the fourth canto of the Tembavani (Pālamātchi padalam), Viramamuni introduces a controversy between the youthful Joseph, who, desirous of leading a life of devotion, had retired to wilderness, and an Angel in the form of an old-man, on the relative merits of seclusion and social life: from this the following extract is taken.

நாடொறுங்கனிந்தசெந்தேனற்கனியளித்தனன்றே
கோடுறுமரமுந்தன்னைக்கொடுத்தலேநன்றேவிவ்வா
றீடுறுமுளனுமுள்ளுமீதல்செய்துறவேயென்பார்
வீடுறுநாலோரொன்னவிளம்பினனிளவல்மாதோ.
காயொடுமரந்தந்தாற்போற்கடித்துறவருமைவெஃகி
வேயொடுநெருங்குங்கானில்விழைந்துதானொழுகனன்றே
தீயொடுகுழைமற்றேருஞ்செவ்வுறச்செலுத்தனன்றே
தூயுடுவுணர்வோயென்னச்சொற்றினன்குரவனம்மா.
பெற்றறமணிந்தநல்லோய்பிறர்மனைவிளைத்தசெந்தீ
யற்றறவோடித்தன்வீடழன்றதேபோலவேட்கைப்
பற்றறவுணர்த்தியுள்ளம்பற்றியநசையில்வெந்தா
விற்றறவுறுதியென்னேவென்றன்னரியசூசை.
தீதிலாவிடமேவேண்டிற்சேணுலகெய்தல்வேண்டுங்
கோதிலாவனத்துந்தன்னைக் கொணர்ந்தகால்விலையும்வெம்போ

ரேதிலாதொழுகலுள்ளத்தியல்பினாலாகுமன்றி
வாதிலாவிடத்தாலாகாமைந்தனேயென்றான்சான்றோன்.

" Is it preferable to present daily the honey-dropping fruits, or *to offer at once the tree with all its branches ?" for, said the youth, "the learned say that for the devotee to offer himself and all that he possesseth is perfect devotion."*

" O thou who art possessed of pure knowledge" said the old man, " whether is it preferable that a man, offering, as it were, the tree with all its fruits, should dwell alone in the wilderness, choaked with bamboos, and attached only to the practice af austere penance, or that he should conduct others involved in sin, in the right path ?"

" O excellent man who art adorned by virtue," said the eminent Joseph, " is it right, that, while a man is instructing others to assuage the fire of passion he himself should be exposed to be consumed by it, like a man whose own house is burned while he runs to quench the flames which have caught his neighbour's house ?"

" If thou art desirous of being where no sin is, thou must seek that place in heaven ; even when retired to the wilderness, the asylum of innocence, the war of the passions may still rage ; freedom from sin proceeds from strength of mind, not from difference of place, O my son !" replied the Sage.

The argument is thus continued through many stanzas, the disguised Angel maintaining the superiority of domestic virtues and the youthful Saint extolling the virtue of retirement. It concludes with the following verses.

பாற்கலந்திட்டதெண்ணீர்பால்குன்றும்பண்புமில்லாவ்
மேற்கலந்தொளிர்ந்தவெய்யோன்வெயிலுமுன்னெரித்ததீபம்
போற்கலந்திசைத்தமற்றைப்புண்ணியந்துறவுவாய்ந்த
சாற்கலந்தியல்பையேற்றுந்தகுதியோவென்றான்பாலன்.
தெருட்டகுமுணர்விற்சான்றோன்சேடனைத்தழுவிச்சொல்வா
னருட்டகுமுணர்வன்பூக்கமரும்பொறையீகைமற்ற
மருட்டகுமியல்தீர்மாட்சிமதியைமீன்சூழ்ந்ததேபோற்
பொருட்டகுநாட்டில்வைகும்பொலந்துறவணியுமன்றே.

" Like milk mixed with water, which by diluting it decreases its natual properties, or *like a lamp burning before the beams of the bright-rayed sun shining on high," said the youth, " are all other virtues, which in truth are only sound, and can these, therefore, add any thing to the high eminence acquired by devotion ?"*

The Sage of lucid intellect tenderly embracing the youth said; "As the stars surround the moon, may not benevolence, knowledge, affection, constancy, forbearance, liberality and other unillusive virtues adorn devotion though it be practised in a country abounding in every species of wealth."

To those who remember the scope of the controversy between the Jansenists and the Jesuits, though this, like other phantasies of the same kind, is fast fading from human cognizance, the following quotation will not be unpleasing: it is curious, also, as a specimen of the dexterity with which the author seizes every handle offered him, if it seem likely to become a useful instrument in the prosecution of his labours, and of the sophistical, but characteristic, ingenuity, with which he endeavours to reconcile doctrines in reality incompatible. The terms தலைவிதி *the destiny of the head*, and தலையெழுத்து *the writing of the head*, used in this extract belong properly to mythology, which feigns, that, previously to birth, the destiny of every individual is written by Brahma in the head of the embryo; this writing, it is supposed, is seen in the indented line which marks the sutures of the skull.—See the 27th canto (ஞாபகப்படலம்) of the Tembávani; the controversy here detailed between Sivasiven, who supports the character of a Hindu guru, and Joseph, commences with the doctrine of the metempsychosis, from which it naturally deviates to the subject of destiny and the origin of good and evil.

கூறியவிந்நிலையுளதேற்குன்றுடனு
முடல்வனப்புங்குறையும்வாழ்வும்
மாறியவிந்நிலையுலகில்வழங்கியகா
ணீதியிதோவழுவோகூறாய்
தேறியவிந்நிலைமிக்கோவென்றுசிவா
சிவன்கேட்பத்தெளிந்தவார்வத்
தூறியவிந்நிலைமதுச்சொற்பூங்கொடியோ
னுரிமறைநூலுணர்த்தான்மீண்டே.
ஆதியிலாவீறுமிலாவினையின்றி
யென்றுமுளோன்மல்ஞென்றே
பேதியிலாவானவருமெம்முயிரும்
படைப்புண்டபின்னீறில்லா
வோதியிலாமற்றுயிர்கண்முதலீறுள்
ளனவென்னவுரிநூலீதாய்
நீதியிலாநவையுறுமுன்முதற்படைப்பெம்
முயிர்கொண்டநிலைமையென்றே.

பார்முகத்துமுதலுடல்புக்கெம்முயிர்க
டோன்றியகாற்பரிவற்றெல்லாச்
சீர்முகத்துவாழரசாயாவருங்கொல்
பன்முகத்துச்சென்றொன்னிற்
பேர்முகத்துவயத்திறையோனீதியதோ
நீதியதேற்பிறழாநீதி
யோர்முகத்துமுன்வினைகளின்றியின்று
மிவ்விகிர்தமுள்தாமென்றான்.
முற்பிறப்பின்விடங்கமுறத்தலைவிதி
காரணமென்றான்முன்பானீதி
தற்பிறப்பினன்புயர்ந்தோன்வேறுபட
விதியெழுதுந்தயவேதென்னச்
சொற்பிறப்பினடங்காதான்றிருவுளமே
யெனவன்னான்குசைமீண்டே
பிற்பிறப்பின்வீற்றியற்றுந்திருவுளமுந்
தானென்றாற்பிழையோவென்றான்.
தெருட்செல்வமிக்கிறையோன்முட்டிலத்தும்
பெய்முகிற்போற்சிந்திப்பெய்த
பொருட்செல்வம்வறிதென்னப்பூரியர்க்குஞ்
சால்பீறைப்பான்பொருவாமாட்சி
யருட்செல்வநகைக்களவாயாவருங்கைக்
கொண்டோங்கவயமேதந்தான்
மருட்செல்வமற்றவையுமாகியது
வறப்பயனோமதியின்மிக்கோய்.
சலத்தெல்லாமோர்நிலையோதருக்கெல்லா
மோர்கனியோதரணியெங்கு
நிலத்தெல்லாமோர்விளைவோநமக்கெல்லா
மோர்முகமோநிலையும்பல்லாய்க்
குலத்தெல்லாம்பொதுநின்றாகுன்றாச்சீ
ரறமொன்றேகுறையொன்றின்றிப்
புலத்தெல்லாமாகுமெனிற்புறவிகிர்த
மொன்றெண்ணார்புலமைமிக்கார்.
காறுபடுந்திறத்திவன்கைப்பொருள்வற்கே
யிவற்கவன்கைக்கருமம்வேண்டி
வேறுபடுமனுக்குலமேயொருப்படுத்து
மிருகையாமிடிவாழ்வன்றிக்
கூறுபடுந்திறத்தென்றும்வாழ்ந்தறவோ

சழத்தியோர்குவ்விற்காண்கி
வீறுபடுநாளில்வருமிருவினைவி
யாப்பயன்பின்பில்லையென்பார்.
திறந்தகாவாழ்விதுவாய்த்திறம்பாவான்
வாழ்வதெனத்தெளியநாமே
பிறந்தகாலுயர்குலமுஞ்சீர்த்திறமுந்
தெரிந்திங்கண்பிறப்பாரின்றி
யிறந்தகாலுயர்வான்மேவிணையாவாழ்
வுற்றாருமியல்பொன்றன்றே
மறந்தகாநல்வினைநாஞ்செய்யளவொத்
தன்றேவர்க்கும்வழங்குமென்றான்.
ஏற்றருமுணர்வினோயியைந்தஞானலோர்
போற்றருமூழ்வினையெனப்புகன்றபின்
மாற்றருந்தலைவிதிமறுப்பவோவென்றான்
றேற்றருமயிற்பறவளனுஞ்செப்பினான்.
ஊழ்வினையென்னினுமுரிமையோர்த்துழி
மாழ்வினையியற்றநீவகுத்தவக்கரத்
தாழ்வினையென்பவோவிறைவன்சாற்றிய
கீழ்வினையிலமறைவிரும்பிக்கேட்டியால்.
நீட்டியவிதியலாற்செயப்படாச்செயுங்
கோட்டியவினைவிதிகோட்டமாமலால்
வாட்டியமனஞ்செயும்வடுவதோவிவ்வா
றீட்டியவறமறமிரண்டிலாமரோ.
இவ்விதியிலையெனவியம்புமூழ்வினை
மெய்விதிமறையினால்விளங்கமாக்களைச்
செவ்விதியிறைவன்முன்றிருட்டித்தாயகா
லுய்விதியிழந்தவர்க்குற்றதோதுவாம்.

வாயேயுணுநஞ்சுறுப்பெல்லாமருவிவருத்தும்வண்ணமெனத்
தாயேதாதைகொண்டவினைதனையராநாங்கொண்டழுங்கத்
தீயேவியதீதொடுசனித்துத்தெளியாவுணர்வின்மனங்கலங்க
நோயேபாலுண்டிடர்கரத்தினுடங்கவினையின்விளைவுற்றோம்.
சொன்னகுரவர்காலமெனத்துதிநூலோர்முற்பிறப்பென்றார்
முன்னமவராலெமக்குற்றமுதியவினையூழ்வினையென்ற
ரின்னவினையல்லாதுதலையெழுத்தும்வேறூழ்வினையுமிலை
யன்னபிறப்பல்லாதிறந்தேயயர்த்துபிறப்பாரிலையென்றான்.

" *Although what thou hast spoken is right," yet, said Sivasiven, " do thou, who art learned in this species of knowledge, declare, whether, if the effects of the deeds of previous births be denied, the inequality of men in this world, some being deformed and some beautiful, some happy and some miserable, be just or unjust;" then Joseph the bearer of the flowering rod, whose pleasant speech flowed from a mouth graced by kindness, again explained the scriptures of the true faith.*

" *He, who hath neither beginning, nor end, nor similitude, is the everlasting, sole, all-righteous God; the celestial beings and our souls, between which there is no difference, having been created, have a beginning, but no end; irrational beings have both a beginning and an end; this being the true faith, in what state were our souls when first created, before they had been guilty of any crime?*

" *When our souls first entered our bodies and appeared in the world, did they resemble prosperous princes free from all misery? but though they did not and though their condition therefore, was various, was this inconsistent with the justice of the Almighty God? if it were just then, also, must the inequality of men in their present generation be immutably just, without reference to the effects of their former deeds."*

The former, Sivasiven, said—" that it was destiny which was the cause of inequality at the first generation of mankind;" " but, said Joseph," is it consistent with the mercy of the Almighty, the God of justice and mercy, to predestine such inequality?" " It is the divine will of him who is beyond expression," rejoined the other. " Then, replied Joseph," can it be wrong to say that it is the divine will which causes the various qualities of those born in after generations?

" *As the clouds pour down rain even in the thorny wilderness, so the all-wise God scattereth abundantly the vain wealth of this world even among the unworthy; but he hath given power to all, to each according to the intensity of his desire, to attain to the matchless glory of the wealth of grace: can it be then said, O thou of superior understanding! that the other kinds of wealth, which are in truth illusory, are the reward of virtue?*

" *Do all streams meet at one place? do all trees bear one sort of fruit? Is there one kind of production from all soils? have all one countenance? As all these are different, so differ the conditions of men, but virtue only, a species of wealth liable to no diminution, is common to men of all ranks; those eminent for wisdom, therefore, describe it as common to all and make no other distinction respecting it.*

" *As the wealth of the rich is necessary to the poor and as the industry of these is necessary to those, so wealth and poverty resemble the two hands, uniting the several classes of mankind; if the virtuous were always seen rejoicing in prosperity and sinners weeping in adversity, they would then deny the retribution for good and evil at the last day.*

" *That we might understand that the prosperity of this world is not constant and that the felicity of heaven is eternal, we know not, said Joseph, at our birth whether we are born to high rank and fortune, but, if desirous of attaining the unequalled joys of heaven, we know at our death that they will be in proportion to the works we have performed during life.*"

" *O learned man worthy of all praise,*" *said Sivasiven,* " *as the wise assure us that unavoidable effects proceed from the deeds of former births, can it be said that there is not an inevitable destiny?*" *Then Joseph, desirous to satisfy all his doubts, however difficult to clear up, answered thus;*

" *When the nature of that which the wise have called the effect of former acts is rightly perpended, can it, as thou hast affirmed, be considered as proceeding from a prescribed destiny? Listen sedulously to the explication of the exalted faith taught by the Lord.*

" *If there be a prescribed destiny it is impossible to avoid it; all crooked actions, therefore, must be considered as the fault of destiny, not the fault of the mind which it affects; all virtuous actions, also, must be referred to destiny and cannot be considered as virtues of the mind; consequently, neither virtue, nor vice can be attributed to men.*

" *To demonstrate that which is called the effect of former acts not to be destiny as thou thinkest it, I will declare, as it is stated in the scriptures of the true religion, what occurred, when the impartial God created mankind, to those who had forfeited their lives.*"

Note.—Here follows an account of the fall of Adam and Eve, which concludes with the two following verses.

" *As poison swallowed by the mouth spreadeth agony through all the limbs, so we, their children, are born to the evils arising from sin, by which we are afflicted in consequence of the acts of our common parents, and to the pains caused by mental confusion proceeding from an overclouded understanding; vexed by the hand of sorrow, we receive the whole fruit of their acts.*

" *The period of the creation of our common parents, here mentioned, the illustrious sages have called the former birth, and the acts done by them in ancient time, the evil effects of which we experience, they have called the effects of former acts; besides that which is here stated, there is no prescribed destiny, nor effects from former acts, nor, after men have been born and have died, are they liable to any future birth.*"

Specimen of Father BESCHI'S *Poem, translated by the Rev.* MR. E. HOOLE, *and published in his Narrative.*

THE DESCRIPTION OF THE CITY OF JERUSALEM.

பயனினான்மறைநூலொக்கும்பகலினைமணியாலொக்கும்
வியனினாலுலகமொக்கும்வேலியாற்கன்னியொக்கும்
முயலினாலலையையொக்குமுனிமுனிவொன்றார்க்கொக்கும்
நயனினாலுயர்வீடொக்குநகரினையொக்கும்வீடே.
பொற்றங்குமுலகந்தன்னைப்பொங்கிருங்கடல்சூழ்ந்தென்ன
விற்றங்குமிரவிகாலும்வெயிற்பிழம்பனையநாறிச்
செற்றங்குமலையினோங்கிச்சேணுறுமதிலைச்சூழ்ந்த
வெற்றங்குமலையைமாறியிகன்றகலகழித்தோற்றம்.
பூவுலகியல்பன்றம்பொற்பொலிமணிநகரம்பொன்னார்
தேவுலகுரிதென்றங்கட்டெளிந்துபுக்கிடுமென்றாழி
தாவுலகிருத்தவெள்ளித்தாடளையிட்டதேபோற்
கோவுலவிஞ்சிசூழ்ந்தகுவளைநீளகழித்தோற்றம்.
சீரியார்நட்புவேர்கொள்சீரொனநிலத்திற்றாழ்ந்து
பூரியார்நட்புப்போலப்புணர்ந்தசைவலமேலாடி
நாரியாரழகுகாணநாணியகமலமிங்கண்
வேரியாரிதழைப்பூத்துவெறியெறியகழித்தோற்றம்.
ஈரும்வாளெயிற்றின்கூன்வெண்ணிளம்பிறைதோன்றவூனச்
சோரும்வாய்விரித்துக்கட்டேய்ச்சொரிதரவகழிதாழ்ந்து
பேரும்வாயுருக்கொண்டன்றுபேய்க்குலம்வெருவுய்த்தெய்தி
பூரும்வாயென்னவங்கண்ணுழக்கியவிடங்கரீட்டம்.
ஓவலிற்றெழிற்பூமாதேயுவந்தநாட்செறிந்தகற்றை
தூவலிற்பகல்செய்பைம்பொற்சுடர்முடிசூழ்ந்ததென்ன
வாவலிற்கிளர்நன்றுட்கொண்டடிகடம்மனத்தைக்காக்குங்
காவலிற்கதுவிடாதகனகமாமதிலின்றோற்றம்.
காரணிபசும்பொற்குன்றின்காட்சிபொன்மதிலைச்சூழ்ந்து
சேரணியனைத்துஞ்சேர்த்தசெழுநகர்திறந்தவாயில்
பேரணியவையுமீட்டிப்பின்னவையுவப்பிற்காட்டப்
பாரணிப்பேழையாரும்பயன்படத்திறந்தபோன்றே.

"*This city, from its universal advantages, may be compared to religion; from the brightness of its ornaments, may be compared to day; from its extent, it may be compared to the world; from the keeping of its walls, it may be compared to a pure virgin; from its crowded state,*

it may be compared to the sea; to its enemies, it may be compared to the anger of saints: for goodness, it may be compared to heaven, and heaven may be compared to this city.

"*Like as the great sea surrounds the golden world (earth) so was the beauty of the wide moat varying its bright waves, and surrounding the walls (of Jerusalem), which shone like a multitude of the solar rays, rose like a mountain to the water of the clouds and pierced the sky.*

"*This extensive moat at the foot of the heaven-reaching walls, seemed like a silver shackle to detain the beauteous city on the sea-girt earth, for fear it should esteem the earth an unsuitable situation, and ascend to heaven as a more appropriate place.*

"*This moat was deep as the deeply-rooted affection of the great; the green weeds in it played on its surface, unstable as the affection of the mean; and the lotus outshone by the beauty of the damsels, could not stay within the city, but here opened its tender leaves and breathed its fragrance.*

"*There were swarms of contending crocodiles, shewing teeth sharp as a sword, and curved like the fair new moon, opening their fleshy mouths, and flashing fire from their eyes, as though the moat had formerly been deepened to hell, and the demons lying there had assumed and wandered about in a terrifying form.*

"*The beauty of the golden walls, was as though the ever-fair earth on a day of rejoicing, had put on a crown of pure and radiant gold; they were no more to be surprised than the temper of holy men, who are filled with goodness beyond desire, and who keep their minds.*

"*As the golden mountain is surrounded by clouds, the city surrounded by a wall enclosing all wealth within it, had a gate which when opened was as though the earth had opened a casket, in which all its treasures had been collected with a desire to display them for universal advantage.*

"The remaining part of the description is equally imaginative; designed to please the fancy of a Hindoo rather than to convey a knowledge of facts.

"The following extract will exhibit the method in which *doctrine* is inculcated in the Tembavani—the two first verses are represented as

the words of the Saviour, addressed to Joseph; the third contains Joseph's reply.

உள்ளியதவநவ்வேறிழுக்கநீண்மரத்தைநாட்டி
விள்ளியவன்புமுட்கும்வியனிருபாயும்பாய்த்தித்
தெள்ளியவரக்கால்வீசத்தியானமீகாமனாக
வள்ளியவினைநீரீர்த்தார்ந்தரிதில்வீட்டுலகிற்சேர்வார்.

வவ்வியதவங்கெட்டம்மாமரக்கலங்கவிழ்ந்ததேபோ
லவ்வியமுன்னீர்மூழ்கியழுந்துவர்பலரிவர்க்குட்
கவ்வியவுணர்வின்றெப்பங்கண்ணினீர்க்கடலைநீந்திச்
செவ்வியகதியின்வீட்டைச்சேர்வரோரிருவரொன்றன்.

மெய்க்குடத்தமிர்துண்டன்னவிரித்தசொற்செவியின்மாந்திப்
பைக்குடத்தனையதீயார்பான்மையென்றுனுஞ்சுட்ட
வக்குடத்தழிவுதீர்த்தலரிதெனத்தவநீத்தாரு
மிக்குடத்தனையதெற்றொன்றனன்மதுப்பெய்கோலான்.

"*Embarking on the ship of true renunciation of the world, and setting up therein the tall mast of strong determination, spreading the two broad sails of devotion and godly fear, whilst the breeze of the excellent gifts of God blows upon them, the pilot of unceasing meditation steering them through the sea of this sinful world, they shall reach the desired haven of eternal bliss.*

"*But whilst the ship of renunciation thus sails along, some, by corruption of the penance they had commenced, will sink into the sea of sin, and perish as though by the upsetting of the vessel: some among them (one or two only) seizing with earnestness the raft of repentance and floating in a sea of tears, directing their course straight-forward, shall obtain the joys of heaven. Thus, although it is difficult rightly to perform penance, it is far more difficult for those who leave off that which they had commenced to reach the shores of heaven.*

"*Joseph, the possessor of the branch which blossomed with honey-dropping flowers, attended to all the divine Son uttered; and by the mouth of his ear drinking in the nectar poured from the vessel of truth, thus replied: We may consider the wicked like to an unbaked earthen vessel, which when broken it is easy to join again, and to bake in the furnace of penance; but as it is impossible to join again a vessel broken after it is once baked, so it is most difficult for those who have left off to be penitent to be restored.*"

Appendix No. 2—*Illustrations made by Father* BESCHI *on a couplet of the Cural.*

See Ellis's Cural, page 88.

மனத்துக்கண் மாசிலனாதலனைத்தறன்
ஆகுலநீரபிற.

That which in spotless purity preserves
The mind, is real virtue; all besides
Is evanescent sound.

"That which in spotless purity," &c.—Vira-mamuni in the third book of the Tonnūl, பொருளதிகாரம் (Poruladigaram) *on the subject matter of composition,* has particularly examined and illustrated this couplet. He introduces it twice; in the first chapter, in which the rules for the composition of prefaces are stated, and in the third chapter, on amplification, where it is made the thesis of a theme or dissertation, intended to exemplify that species of composition. In the former it is thus paraphrased.

இல்லறந்துறவறமெனவிவ்விரண்டினுள்ளு மடங்கிநிற்குமெல்லா வறங்களுமனத்தின்றூய்மையாற்பேறும்பெருமையுமடையுமெனவும் மனத்தினுள் மாசுகொண்டவன் செய்யுந்தவமுந் தானமுமற்றயாவு மறத்தினரவமாவதன்றியறத்தின்பயனுளவல்லவெனவு. மக்குறளிருப யனிவையெனவிரித்துக்காட்டுதும்விரிப்பவே.மெய்யும்பொய்யும்விள ங்கியுட்பயன்றருமெய்யறத்தின்றன்மையேவெளியாயிஃதோன்றுண ர்ந்துநாமதற்கொப்பநடந்தாலிதுவீடெய்தும்வழியெனக்காணப்படு மே. பெரும்பொருணேர்ந்துபொய்மணிகொள்வதுகேடென்றுயினும் பொருளைநேர்ந்து முடலைவாட்டியுமுயிரைவருத்தியுமேற்கதிவீட்டிற் செல்லாச்சிலபொய்யறங்களையிட்டுவத்திலுங் கேடாமன்றோ. இதனை விலகித் தன்னுயிராக்கங் காப்பது வேண்டி யிக்குறட்பயனாராய்வது நன்றே.

Every species of virtue is included under the two general heads of domestic virtue and religious virtue. It is here said, that by purity of mind, eminence and worth is obtained and, that devotion, or charity, and all other acts performed by one whose mind is not pure, hath only the empty sound and not the essence of virtue. The two significations of this Cural are thus distinctly shewn. When thus explained the truth and falsehood shine forth, and the true nature of virtue, whence substantial profit is derived, becomes apparent, and if we reflect on this and act accordingly, the path leading to salvation will be seen. Although loss be

sustained by the expenditure of vast wealth in the purchase of a false jewel, is it not yet a greater loss, after the wealth has been expended, the body emaciated, and the soul afflicted, that a few, false virtues only, not current in heaven, should be collected? avoiding this, therefore, and endeavouring to preserve that which is really profitable to the soul, reflect seriously on the purport of this Cural.

The following extracts from the dissertation of which this couplet is the thesis contains the citations from Tamil writings made by this author in direct illustration of it.

புறத்தறச்சாயற்புகழ்ப்பிறர்மெய்த்-திறத்துளந்தம்மைத்தீயெனச்சுடச்சுடச்-செறிவாய்மருளறத்தெளிந்துமெய்ம்மைகண்-டறிவாரறப்பயனைசையுட்பட்டார். இதனாலன்றே

வானுயர்தோற்றமெவன்செய்யுந்தன்னெஞ்சந்
தானறிகுற்றப்படின். என்றார் அன்றியும்

நீட்டியசடையுமாகிநீர்மூழ்கிநிலத்திற்சேர்ந்து
வாட்டியவுடம்பின்யாங்கள்வரகதிவிளைக்குமென்னிற்
காட்டிடைக்கரடிபோகிச்சயமூழ்கிநாட்டுணின்றும்
வீட்டினைவிளைக்கவேண்டும்வெளிற்றரைவிடுமினென்றான்.

நுண்டுகில்வேகலஞ்சிநெருப்பகம்பொதிந்துநோக்கிக்
கொண்டுபோய்மறையவைத்தாற்கொந்தழல்சுடாதுமாமோ
கண்டத்திறவியார்தங்கடிமனைதுறந்துகாட்டுட்
பண்டவாவுளநீங்காதேற்பாவமோபரியுமென்றான்.

இங்ஙனேபுறத்தவவேடமன்றியுள்ளத் தூய்மையில்லா முனிவர்க்குச்சிந்தாமணியிற்சீவகன்சொன்னான்.

வானோர்புகழ்ந்துவணங்கியதுறவுந்
தானோர்பயனிலதராதகத்தழுக்
காறுளதேலெனிலகத்துளறத்தின்
பேறுளதென்பதுபிழையோவென்பார்.

என்பதிவையுமித்தொடக்கத்தனபலவுங் கரிப்புறத்திணையாம்-இவ்வாறேனைத்திணைவேண்டுளிவிரித்துக்கூறுக.

Those desirous of obtaining the fruit of virtue, having freed themselves from the delusion, arising from the applause given by others for the appearance of virtue, while in reality their conscience burned within them like a fire, will comprehend the truth. For this reason hath not the Author said thus?

CURAL.

Of what account is the understanding, which reaches beyond the heavens, if his heart suffer from conscious guilt.

And again;

CHINTAMANI.

If it be thought eternal felicity can be obtained by wearing long and matted hair, by bathing in water, lying on the ground, and emaciating the body, then may the bears that bathe in the lakes and wander in the forests, also, obtain felicity;—quit, said he, such ignorant notions.

If from fear of a fine cloth being burned you place it within the very fire, will it not be consumed? So, if they, who forsake domestic life and the society of those whose bosoms are perfumed by civet, retain in the wilderness their ancient desires, will they, said he, be freed from sin?

Thus, in the Chintamani, Sivagen addresses one, who, void of inward purity, has assumed the garb of outward devotion.

If the mind be inwardly impure, even devotion, which is reverenced and praised by the heavenly beings, will produce no permanent fruit, but can they impute guilt to him (even if such ceremonies be omitted) who is endowed with inward virtue?

These passages and many others like these prove what has been stated by direct examples, if further illustrations be required they may be given at large.

Note—Mr. Ellis has translated only a few out of many reasons and rules connected with logic and corresponding with the above subject. The following is the last part of the same.

These extracts are intended to exemplify the position, that, whatever eminence may be acquired, neither virtue nor the permanent benefit of virtue can be possessed by those innately wicked; they are from the 2d canto (இராவணன் மந்திரப்படலம்) of the sixth book (யுத்தகாண்டம்) in which Cumbacarnen, one of the brothers of Rávanén, reproves, in a council of the Giant chiefs, the conduct of the former, in forcibly seizing and detaining Sitei, the wife of Rámen, and vainly endeavours to persuade him to restore her to her husband. Previously to the holding of this council, Anumán, one of the leaders of the silvan tribes that accompanied Rámen to the attack of Ilangei, who, though in the form of an ape, was in reality an incarnation of Pavanen, the god of the wind, had penetrated to the capital of Rávanén in search of Sitei and, having been taken prisoner, had been allowed to depart after his tail, wrapped in oiled cloth, had been set on fire as the punishment of his in-

trusion; with the torch so furnished him, he had laid the whole city in ashes, finally escaping unhurt in defiance of the utmost efforts of the Giants:—hence the allusions in some of the following verses.

Rámāyanam.

ஓவியமமைந்தநகர்தியுணவுளைந்தாய்
கோவியல்பழிந்ததெனவேறொருகுலத்தோன்
றேவியைநயந்துசிறைவைத்தசெயனன்றோ
பாவியருறும்பழியிதிற்பழியுமுண்டோ.

Thou hast caused a beautiful city to be devoured by the flames; is it right to desire the wife of one of another race and to detain her in captivity as if thou hadst lost every kingly quality? is any sin the wicked commit a greater sin than this?

என்றொருவனில்லுறைதவத்தியையிரங்க
வன்றொழிவினுயமறைதுறந்துசிறைவைத்தா
யன்றொழிவதாயினவரக்கர்புகழ்ய்யா
புன்றொழிவினுமிசைபொருந்தல்புலமைத்தோ.

Contrary to the precepts of religion, thou hast detained in captivity and overwhelmed with sorrow, a woman who was engaged in devotion, belonging to the house of another, O perpetrator of violent acts! and if in that day the glory of the Araccar was obscured, would it be wise in us to sanction so disgraceful an act?

தூயவர்முறைமையேதொடங்குந்தொன்மையோ
ராயவர்நிற்கமற்றவுணராதியார்ந்
தீயவரறத்தினுற்றேவராயது
மாயமோவஞ்சமோவன்மையேகொலோ.
அறந்துறந்தமரரைவென்றவாண்டொழிற்
றிறந்தெரிந்திடிலதுதானுஞ்செய்தவ
நிறந்திறம்பாவகையியற்றுநீர்மையன்
மறந்துறந்தவர்தரும்வரத்தின்மாட்சியால்.
மூவரைவென்றுமூவுலகுமுற்றுறக்
காவலினின்றுதங்களிப்புக்கைமிக
வீவதுமுடிவெனவீந்ததல்லது
தேவரைவென்றவர்யாவர்சீரியோர்.
வினைகளைவென்றுமேல்வீடுகண்டவ
ரெனையொன்றியம்புதுமிவர்தந்தீய்மையான்
முனைவருமமரருமுன்னும்பின்னரு
மனையவர்திறத்தினையாவராற்றினர்.

The ancients followed the path of the virtuous, but besides these all the other Auner (Giants) are evil doers : the station of gods is obtained by virtue, but is it obtained by delusion, deceit and violence ?

If we consider the mighty deeds by which, even after we had forsaken virtue, we conquered the gods, we shall find that they were not an effect proceeding from any acts of devotion performed by ourselves, but from the power conferred on us by those who had forsaken evil (i. e. by the Sages and the gods by whom we were endowed with power).

Having conquered the divine Triad, and having received under their protection the whole world, while exulting in prosperity, they are dead and have toiled in vain ; who then among the conquerors of the gods are truly great?

Who shall describe those, who, having overcome both good and bad works, have obtained eternal felicity ? but who among these, the giants, have, from their innate wickedness, at any time performed virtuous acts like the sages and the gods ?

கோனகர்முழுவதுநினதுகொற்றமுஞ்
சானகியெனும்பெயருலகின்றம்மனை
யானவள்கற்பினாலழிந்தவல்லது
வானரஞ்சுட்டதென்றுணர்தல்மாட்சியோ.

This royal city and thy former victories have been consumed by the chastity of Janiki, the mistress of the world ; if not, what glory is there in the thought that they were burned by an ape?

மீனுடைநெடுங்கடலிலங்கைவேந்தன்முன்
றானுடைநெடுந்தவந்தளர்ந்துசாய்வதோர்
மானிடமடந்தையாலென்றவாய்மொழி
தேனுடையலங்கலாயின்றுதேர்தியால்.

It was foretold that the power of the king of Ilangei surrounded by the ocean, obtained by long penance, should decline by means of a female of the human race ; know this to be now accomplished, O thou who art adorned with a wreath of sweet flowers !

மனவிருளிரிய மணிவிளக்காகத் தனியருளிறைவன் றந்தமறைநூலாய்ந்துழியீண்டியா னறைந்தயாவும் வாய்ந்தமெய்யென வழங்கித் தோன்றுமே.

நுந்நாயெனபுகழ் நுவன்றுபாட வெந்நாவெரீட்பலி மென்மேற்கொன்றிட அப்புகழப்பலி யனையநும்மனம். ஒப்பிலாதென்னை யொருவிநிற்றலால். அவையெலாம்பொய்ப்பொருளாகக்கைக்கொளா

நவையெனவெறுத்தனேஞனேயெனவும். புணர்ந்திடத்தேவ பூசையி
னேர்ச்சி கொணர்ந்துழிபகையுட் கொண்டதென்றுணர்கின். அகன்
றப்பகைதீர்ந் தல்லாற்பூசையு நகன்றுமறுப்ப. ஞனேயெனவும்.

மாசிலான்மறையென வறைந்தபின்மனத்துண் மாசிலஞதலே
மாண்புறுமனேத்தற னல்லதுதீயவையகத் தொளித்தினிய. வல்லுருப
காட்டன் மாணறமென்பவோ என்பதிவையுமித்தொடக்கத்தன ப
லவுநூற்புறத்திணையாம்.

All that I have stated will be verified, if you look at the true religion which was inculcated by the one only gracious God, who said, as precious light to expel the darkness of the mind, thus;

[Amos 5, 21.] I hate, I despise your feast-days, and I will not smell in your solemn assemblies. Though he offer me burnt offerings and your meat offerings, I will not accept *them*: neither will I regard the peace offerings of your fat beasts.

[Samuel i, 15—22.] And Samuel said, Hath the Lord as great delight in burnt offerings and sacrifices, as in obeying the voice of the Lord? Behold, to obey is better than sacrifice, and to hearken than the fat of rams.

[" Matt. ch. v. 23—24.] Therefore if thou bring thy gift to the " altar, and there rememberest that thy brother hath ought against " thee; leave there thy gift before the altar, and go thy way; first be " reconciled to thy brother, and then come and offer thy gift."

Explanation of the word ஆகுலம், *introduced in the foregoing couplet or text.*

" All besides is evanescent sound"—The term in the original, translated by the two concluding words, is ஆகுலம், which signifies literally *a loud turbulent noise;* the line is thus translated and explained by the Latin commentator. " *Cætera omnia conditionem habent strepitus.* Sensus est eam esse veram virtutem, quæ in animo culpam non admittit, nam animum culpa fœdatum habentis, verba, et habitus, et actiones ipsæ quæ virtutem spirent, habent conditionem strepitus; tum, quia ad id ordinari solent, ut a cæteris videantur et audiantur; tum, quia eo tantum tempore quo videntur et audiuntur, ut virtuosa laudantur, sed statim, uti strepitus, evanescunt, quia non valent alicui beatitatem afferre." I have followed this interpretation as it agrees with that of

Vira-mamuni, and as it corresponds exactly to the expression of the original; but the word ஆகுலம் may metaphorically be rendered, *ostentation, hypocrisy.* Parimel-azhager paraphrases it by ஆரவாரம் which signifies literally the *confused clamour arising from a mob*, but is often synonymous with இடம்பம், the term commonly used to express *pomposity, ostentation, hypocrisy.*

VI.—*Notice regarding the Sects of Hindus called Tengala and Vadagala.* —*By* C. P. Brown, *Esq.*

The following brief notice regarding these sects is now collected from living authorities, who themselves are Bramins of the Tengala sect.

The Vaishnava sect in the peninsula of India is divided into two classes, called Tengalas and Vadagalas, who hold each other in religious hatred. These divisions affect Sudras as well as Bramins.

They are known from one another by the mode in which they wear the mark in the forehead. Each sect wears an upright yellow or red streak, down the forehead. And on each side is a white line; these converge at the brows, forming an appearance like a trident.

The Tengalas draw the line low down the face. The Vadahalas draw it no lower than the brow.

The Tengala marks join on the nose. The Vadagala mark does not. The Tengala wears a line across the face between the eyes, somewhat like a crescent.

The Tengala women wear the yellow upright line: a few women wear the lower mark. No woman wears the white marks.

The particular saint of the Tengalas, whether Bramins or Sudras, is *Manavala mā muni;* who wrote the comment on the *Dravida Prabandham* (or *Tamil Veda*), written by the twelve saints called Alwars. This sage has been deified by his followers, while Vedantachari is adored by the Vedagalas. He and his *opponent* (a phrase which they disown) were pupils of *Ramanujachari*, commonly called *Bhashya-carlu*, or the "Commentator" on the Divine Texts. It is to be observed that neither sect speaks disrespectfully of the leader or apostle of the opposed sect. And it is not easy to comprehend how both teachers can be supposed to obey the doctrines of Bhashyacarlu.

The prayers they use are similar, except as to the commencing stanza. The Tengala mantram or verse runs thus:

Sri Sailésa dayā pātram, dhī bhacty ādi gun'ārn'avam
Yatīndra pravan'am vandé Rámyajā mātaram munim.

But the Vadahalei exordium runs thus:

Rāmānuja dayā pātram, jnāna vairāgya bhūshan'am
Srī madvēncata nādhāryam vandē vēdānta Dēs'icam.

In the former verse Rāmyaja Matrĭ is the name of Manavala mamuni: in the latter, Védanta Desica is the title given to Védantachari.

It seems that the former verse is used in all the temple at Combacōn'am, and that at Manjācuppam, north of Pondicherry; perhaps at a few others.

This verse is used in *private* by the Vadagalas, but if they ever venture to recite it audibly in a Tengala pagoda it is resented as blasphemy, and leads to great outrages.

Ten-calei, denotes *Southern Veda;* and *Vada-calei* denotes the *Northern creed.* These words form the origin of Tengala and Vadagala,

Among the Vadagalas widows are shaved. This custom the Tengalas reject. There are some other discrepancies. They intermarry and eat together.

But the discriminative mark in the forehead is the great sign, and so important do they hold this that various Vishnu temples have the sectarial mark cut in stone over the gate.

The discussion regarding this mark is traced to a difference of opinion as to the signification of a celebrated Sanscrit text or half verse, which directs that the mark in the forehead shall be *Nāsādi kēsa Paryantam*, " from the nose to the hair." Now the Vadagalas say this expression *from* the nose denotes not any *part of* the nose, and therefore they begin the line between the brows.

The Tengalas deny this; and dividing the nose into three parts, declare that the *upper third* of the nose is included in the word ādi. For they argue that " every thing has a beginning, a middle, and an end; and in the verse in question the word " adi," *beginning*, denotes the first portion."

This discussion (a counterpart to that of the big-endians in Swift's description of Lilliput), has led to serious disturbances and the loss of many lives. Nor does any annual feast occur without a recurrence to the wrangling regarding the celebrated verse now cited. It is not even satisfactorily ascertained in what book this verse is recorded. A

learned Tamil divine, who died about fifteen years ago named Annavappengar, author of a commentary on the Uttara Rama Charitra, wrote likewise a polemical volume on this topic.

It is to be observed that both sects worship the same god Vishnu; and use the same rites. Their differences regard none but points which are known to be mere trifles. Indeed, they chiefly regard particular customs connected with eating and drinking.

The Ecādasi Srāddham is not practised by the Tengalas, nor do they use the bell in worship.

The Tengala sect has prevailed greatly over the other, who are nearly silenced both at Sri Rangam, (Trichinopoly) and Madras.

At the sacrifice called Yajna, the Tengalas say they use the *pishta pasuh*, or small figure of a goat, made of paste. The others use the *chhaga pasuh*, or living goat. But in fact both sects have laid aside the yajna: which the Smartas continually celebrate. Hence among the Tengalas and Vadagalas, the name Somayazi is laid aside: for that title appertains to the Bramin who has celebrated this sacrifice.

VI.—*Note on an Ancient Hindu Grant.—By* Walter Elliot, Esq.

Some time ago I obtained a set of copper-plates, united by a ring in the usual mode of ancient Hindu grants, bearing an inscription in a character which was said to be unknown. The plates are three in number, $7\frac{8}{10}$ inches long by $1\frac{1}{2}$ in breadth, of a shape differing from any I had hitherto met with. Unfortunately the symbol on the ring or seal is defaced. The plates were said to have been found in the *kol*, or lake, near Masulipatam, some years ago, and had been laid aside as utterly unintelligible.

Several of the letters being nearly identical with the Hala Canarese alphabet, most of the words were with some difficulty deciphered. The characters bear a considerable affinity to those of an inscription from Amrawutty, published in the Journal Asiatic Society* of Bengal, but appear to be of a considerably older date, if such an inference may be drawn from the ruder and more simple forms of the letters, as will appear from the fac-simile opposite, which shows likewise the shape and size of the copper-plates. The language is Sanscrit, the style being simple

* Vol. vi. p. 218—Pls. xi. xiii.

though old, and some of the terms obsolete. A transcript in Nagari is given, the translation of which is as follows:

" Salutation!

" From the victorious Vengipur, Maha-raja-sri-vijaya-Nandi Varma, " bound up in meditation on the feet of the Lord Chitra Ratha Swami— " devoted to the feet of the saints (Bhaturakas)—the most pious—the " eldest son of Maha Rajivacha Varma and of Kulanka—commands the " villagers, and the head inhabitants of the village of Vidanūrpalli, in the " district (Vishaya) of Kūdūhāra—Hail!—On account of the virtue of " my imperishable Kula and Gotra, and for the increase of my personal " reputation, the village is bestowed (vrittaha) on the Bramins re" siding in the excellent agraharam of Chinnapākūrvaka, of various " gotrams, readers of the vedas, who are in number 157—knowing this, " let all that is proper to be relinquished, be given up, by the Rajah's " public officers, who have authority over the land (desadipati), and let " it be maintained.

" On the eighth day of the decreasing moon, in the month of Poushya, " in the 7th year of the prosperous reign, this grant [pattika] is made. " Let the grantees enjoy it in virtue of this order.

" Land has been given by many, and it has likewise been continued by " many. Whosoever possesses the land shall enjoy the fruits for the " time being.

" The giver of land rejoices in heaven for 60,000 years. He who takes " it away, or consents to its resumption, shall remain for the same period " in hell."

This ancient deed though unfortunately destitute of an ascertained date, is possessed of considerable interest, from the indication it affords of the dynasty which ruled in the tract now known as the Northern Circars, but anciently as the Venga, Kalinga, or Andhra Desams, anterior to the Chalukya family.

The earliest grants of the latter race occur in saca 528, corresponding to A. D. 606, and I have lately had opportunities of examining copper sasanams, given by different princes of this house, in sacas 897 and 1001, which clearly show by the more modern form of the writing, the superior antiquity of that of Nundivarma.

In these documents the genealogy of the Chalukyas is brought down to the union of the family with that of the Cholas of the south, about the close of the 10th century of the Salivahana æra, without the mention of any names, bearing the least resemblance to Rajivaksha Varma or Nundivarma, and as the country over which they reigned is invari-

ably termed Vengidesam, we may conclude that the Nandivarma who reigned at Vengipur must have been anterior to the 7th century.

No such names as Nandivarma's or his father's occur in any of the lists of the Southern Dynasties, except in that of the Vijayanagur Rajas,* but the Nanda who is there said to have founded Warungol and Nundapur in A. D. 1034, (?) cannot possibly be identified with the Nanda of the inscription, for at this period the Chalukyas were the lords of Vengidesam.

Of the limits of Vengidesam or Vengi Mandalum, it does not appear necessary to say more at present than may tend to illustrate the site of Vengipur, the capital of Nundivarma.

Four places of this name are found in the Northern Circars. Two of these named Chinna Vengi and Pedda Vengi are situated close to each other, in the vicinity of Ellore; another is found near Chintapalli in the Guntoor district, and the 4th is a deserted site, named Vengipad, in the Palaveram zemindary, to the north-west of Rajahmundry.

The following account of the two first mentioned places was received from an intelligent native, who made the inquiries on the spot.

"About eight or ten miles north of Ellore, is situated the village of Peda Vegi, half an hours walk to the north of which is Chinna Vegi, and five miles south of these, is another village named Dendûlûr, with several hamlets attached to it, named Ganganagudem, Sanagudem, &c. According to the local tradition all these formerly constituted one large city, in which were numerous temples dedicated to Siva. The ruins of about fifty fanes sacred to this deity, still exist in Dendûlûr, and likewise four statues or idols of Vigneswara, one of which, very large, is on the southern side of the village, near a tank surrounded by date trees. A high mound of earth called Bhimalingam Dibba is found on the east side of the village, and a tank, named Macalama cheravu, to the north, has a mound in the centre, on which are two stone bulls. There is another tank to the west of the village, called Narikalawari cheravu, on the banks of which are two sila sasanams, standing upright, and two more which have fallen down, but which were erect about four years ago.

"Between Pedda Vegi and China Vegi is another remarkable mound. All of these places above mentioned are supposed to conceal enormous treasures. In later times Pusapati Madava Varma reigned in this place."

The above are sufficient indications of the site of a large city, and the inscriptions noted as still existing at Dendûlûr, will probably throw further light on the subject. Wangipur in the Guntoor district seems to be

* As. Res. vol. xx.

a place of no importance, but at Vengipad, north-west of Rajahmundry, there are said to be extensive ruins, but the head serishtadar of that district, in reply to some questions addressed to him, states, that the local tradition of that province, points to Pedda Vegi in the Masulipatam district, as the former site of Vengipur.

In the preface to the Telugu translation of the Mahabharat, Rajahmundry is styled the "central gem of Vengidesam," "Nayakaratnam." Campbell's Tel. Gram. pref. p. x. At that time it had become the capital of the Chalukyas, and the ancient capital must have been in a state of decay.

Of the other places mentioned in the deed, little information is obtainable. Kuduhara is said to be the ancient name of the district now occupied by the Collar lake.

The local tradition states it to have been formerly inhabited by certain Bramins, who became so wicked that they provoked the divine vengeance, and were destroyed by the God of fire. One virtuous Bramin alone, and his wife, received timely warning to fly, the remainder were all burnt up, and the earth sank to the depth of 24½ cubits: in proof of which it is asserted that, on digging in any part of the lake during the hot weather, the soil displays signs of the action of fire. This may refer to a volcanic phenomenon having caused the subsidence of the tract.

Vidanur palli has not been recognized, but mention is made of Chinnapakur in an ancient MS. account of the district of Condavir, forming part of the Mackenzie Collection, and noticed by the Reverend Mr. Taylor in his 4th Report at vol. ix. p. 13 of this Journal. At p. 12 of the MS. it is stated that Bala Bhaskara Deva of the Gunapati race, made a grant of 360 kundees of land, to the Bramins of 12 gotras in Chinnapakur or Kurupadu, and gave it the name of Muppala, in the saca year 1056 (?). And again, at p. 18, in a list of villages which have a Samprati or Curnum of the Balikuruwar race and Sandilya gotra, it occurs in the following order.

Gundala.
Velanadu.
Betpudi.
Narayanpuram
Chinnapakur
Muppalapudi.
Gollapadu.
Munagapadu.
Buckapuram.

Chitraratha is a title of the sun.* It occurs as the name of one of

* Wilson's Dictionary in verb.

the Pandyan Dynasty of Madura.* What particular deity is designated by Chitraratha Swami, seems doubtful, some consider it a designation of Siva, others of a Jain divinity.

VII.—*Note on the Defaced state in which the Statues of the Jains are now generally found, as connected with the persecutions and overthrow of that People.—By Lieut.* T. J. Newbold.

The mutilated state in which the statue presented to the Society, and others surrounding it, were found, bears silent testimony to the rancorous spirit with which the Brahmins and Jangams persecuted the Jains; and which impelled them, as we are assured on the testimony of many native writers, to wreak their vengeance, unglutted by the overthrow and expulsion of the rival sect, upon their senseless temples and images, and to do their utmost to obliterate every trace of the heretical creed from the face of the earth. In various localities that I have visited in Mysore, the Carnatic, the eastern portion of the Southern Mahratta Country, and the Nizam's territories, the Jaina *bastis* have been converted into temples consecrated to *Mahadeo*, the *Lingum*, &c. The most prominent distinguishing marks of their origin are commonly obliterated; but it frequently happens that some small bas-reliefs of the Jaina *Tirt'hankars*, or of the female effigy canopied by the uplifted trunks of two elephants, have either escaped notice, or been permitted to remain from their insignificance, sufficiently indicative of the religion of the builders. The larger and detached images are either destroyed or disfigured; and thrown outside the walls of the place. The Brahmins, even at the present day, declare it to be unlucky to look upon the countenance of a Jaina image: consequently the features of the statues have rarely escaped mutilation or destruction.

At Bagwari in the Southern Mahratta Country, near which place *Basava*, the celebrated founder of the Jangam sect, and subverter of the Jaina kingdom of Kalyan was born, are many marks of the furious spirit of extermination: the numerous Jaina temples have, with two exceptions, been levelled with the dust, and their remnants, in the shape of broken altars, and elegantly carved pillars, employed in repairing the walls of the town. One of the two *bastis* left standing has been converted into a temple to the apotheosis of the arch prose-

* Prinsep Us. Tab. ii. 121.

cutor of the Jains—*Basava,* and the other into a manufactory for earthen ware. Similar evidences of this spirit are visible among the ruins of Annagundi, Bejanugger, and at Courtney, in the Ceded Districts. The latter, now an insignificant village, was formerly a place of importance under *Jaina* ascendancy: one of its principal *bastis* is occupied by the sacred feet of the Indian Mars—*Comarswami*—images of the god *Ganesa*—the goddess *Parvati*—the bull and *Lingum.* Another has been converted into a mosque by the Mahomedan followers of Hyder and Tippoo, and a third forms the *Math* of a Jangam priest. The large image of one of the *Tirt'hankars,* is seen cast outside the western gate, disfigured in the usual manner, and the lower extremities buried in soil. The destruction and defacement of the Jaina inscriptions on stone, and substitution of others in their room, are much to be lamented, and I would strongly urge the Society to direct its attention towards the copying of all such as still exist in various parts of the peninsula, before it be too late. The rancour of the Jangams and Brahmins towards the Jains still exists in smothered, though unaltered, bitterness. The copies should be taken, if possible, by means of Jaina scribes in order to avoid forgeries, alterations, or interpolations. The indefatigable and successful exertions of Mr. Walter Elliot have already gone far to place the history and chronology of peninsular India, on a surer and more solid basis than hitherto, grounded on the chronicled and unbiassed information contained in 595 inscriptions on stone and copper, collected in various parts of the Southern Mahratta Country, Mysore, the Nizam's dominions and Sunda.* It is scarcely necessary to remark how extremely valuable such information is, gathered from these mile-stones of time's course; and that a wide field still remains untrodden to all who, imbued with a liberal zeal for the advancement of knowledge, enjoy similar opportunities of collecting it.

Although the Jains were not able to defend their temples and larger statues from profane hands, they contrived to carry off the smaller images, and many of their sacred books, which they preserve with the jealousy natural to the weaker sect. The smaller images that I had opportunities of seeing in Canara and the Southern Mahratta Country, were all either of brass or a white slightly veined† marble, which is said to be brought from the *Uttara Des,* or country north of the Nerbudda, and represented the twenty-four *Tirt'hankars,* both singly and in groupes, in their peculiar standing or sitting-at-ease postures. The

* Vide Madras Journal, vol. 7. p. 193.

† Marble appears to be a sacred stone among the Jains, being always preferred when procurable, and is sometimes brought from great distances.

Jaina colossal statue of *Gomúta Raya* on the rock of *Sravan Belgola,* in Mysore, said to be 70 feet 3 inches in height is of granite. The Duke of Wellington, who visited it, was of opini n that the rock had been cut down until nothiug but the image remained. This opinion I found corroborated by the testimony of the priests and natives of the locality, and the truncated shape of the rock on the summit. The jealousy of the Yaitis permitted only a cursory examination of the base, which has every appearance of having been cut down to the plane on which it rests, and was probably one of those prodigious blocks, frequently seen as tors and logging stones on the granitic elevations of peninsular India. In gazing on the gigantic proportions of this colossus, and the hill constituting its base, from the plain below, one cannot avoid being reminded of the story of Dinocrates the sculptor, proposing to cut down mount Athos into a stupendous statue of Alexander, holding a town in his left hand, and in the right a large basin to receive the streams issuing from the mountains sides.

Another Jaina statue in granite, of the same personage, though of inferior dimensions, occurs at Carculla, in Canara. It is said to be thirty-eight feet in height*, and to have been sculptured A. D. 1431. Both have hitherto escaped destruction, and possibly owed their safety to the superstitious feeling of veneration, which objects of great magnitude, wondrous art, or strange deviations from nature, rarely fail of inducing in the minds of all Hindus, without reference to caste.

I have already mentioned that the religious statues of the Jains are either in one erect or sitting posture: they are generally naked, and in attitudes betokening a state of repose, consistent with the metaphysical ideas entertained by this sect of a state of future beatitude; or of the profound abstraction and meditation on things divine, essential to the perfect attainment of that state. To this circumstance, superstitious adherence to ancient models as well as to the operation of the *beau ideal* of Hindu sculptors, which is highly unfavourable to the demonstration of the finer shades of anatomical development, and the expression of mind by its action upon the features, may be mainly attributed the tame and insipid character of their single statues, so odious to eyes that have been accustomed to look upon the exquisite productions of a Praxiteles, Chantrey, or Canova. The same causes prevented the Egyptians, from rising in the art of sculpture; who, we are informed by Mr. Wilkinson, even at the latest periods continued to

* One foot less than the celebrated statue to Minerva, of ivory and gold in the Pantheon at Athens, by Phidias.

follow the imperfect models of their early artists, and grace and feeling were for ever prevented from forming a feature of their sculpture: and though they made great progress in other branches of art, though they evinced considerable taste in the forms of their vases, their furniture, and even in some architectural details, they were for ever deficient in the combination of ideal beauty with the natural position of parts in the human figure. One great impediment to the advancement of the statuary's art in Egypt, was the unvarying posture of the figures, which were always in a state of repose, or in a position that only required the limbs to be straight, without any attempt at action, or indeed any indication of life: " all was made to conform to the same invariable model, which confined the human figure to a few conventional postures." Such are a few points of resemblance common to the productions of Jaina and Egyptian statuaries; which, had not a vile superstition pressed like an incubus on their rising improvement, would have anticipated in excellence and beauty the most exquisite sculptures of Greece. The Jaina statue now presented, was taken from the ruins of Bijanugger, and is doubtless that of *Pareswanath* from the attitude, contour, and serpent folds behind the back of the image. *Pareswanath* is the 23d *Tirt'hankar* of Jaina mythology, and is often represented with the cobra di capello canopying his head with its extended hood: not as a symbol of eternity, but from some circumstance connected with the history of this saint, recorded in his *pura'na.*

Subjoined is a list of Jaina MSS., now extant in the peninsula: which, if not already before the public, or among the Mackenzie papers, it would be advisable to procure copies of. The list was given me by a Jaina priest of Talicota, in the jaghire of the Mahratta chief, Rastia.

1st. The *Siddhanta Sastra* which proceeded from the mouth of *Ardenath* himself, the first of the last twenty four *Tirt'hankars,* written by *Gautam-Muni,* in the *Ghata Bhasa,* and afterwards compiled in Sanscrit, Canarese and Mahratta. This is considered the most sacred of their books.

2d. The Siddhanta Purána.

3d. Naga Komara.

4th. Herri Wemshu.

5th. The twenty-four Puránas, of the twenty-four last *Tirt'hankars.*

6th. The Jaina version of the Ramayana.

7th. Vijaleng Purana.

8th. The Manter or St'hoter of Bhagwant, the Jaina ritual.

The *Hari Vansam* is equivalent to the *Mahavansu*, and is supposed to be a version of the *Mahabharat.* The *Vejaleng purána* is the history of *Vejala*, the Jaina king of *Kalyan*, and the rise of the Jangam sect. The *puránas* of the first twenty-four *Tirt'hankars* or deified saints, are not procurable.

VIII.—*On an error in Dr.* Thomson's *Mineralogy.—By Captain* J. Campbell, *Assistant Surveyor General.*

In mineral analysis magnesia is one of the most difficult earths to precipitate. It has the peculiarity of forming a great many soluble double salts, and even its carbonate is partially decomposed by cold water, so that a portion is taken into solution. These double salts appear not to have been examined with sufficient attention by chemists; Rose in his Manual of Analytical Chemistry remarks that, in precipitating magnesia as a carbonate, carbonate of soda cannot with equal good consequences be employed instead of carbonate of potash,—carbonate of magnesia, according to Mosander, forms with carbonate of soda a double salt, this salt is decomposed, neither by boiling the solution, nor by evaporating it to dryness; while on the contrary the analogous double salt, containing carbonate of potash and carbonate of magnesia suffers decomposition thereby. The wash water also dissolves much more of the double salt containing soda, than of the simple carbonate of magnesia, yet, for all that, were carbonate of soda employed to separate magnesia, a great excess would be obtained in the analysis. Dr. Thomson says, "the employment of carbonate of soda, instead of carbonate of potash, has also a tendency to prevent the formation of the double salt, for soda-carbonate of magnesia, does not form nearly so readily as potash-carbonate." The easiest, and readiest mode of precipitating magnesia, is from the ammonio-muriatic solution, by adding an excess of ammonia, and then adding phosphate of soda, when an immediate precipitate of ammonio-phosphate of magnesia is thrown down. This salt is almost insoluble in cold water, and therefore this method is the best, and readiest in a rough quantitative analysis, such as is desirable in the present state of our knowledge of our Indian minerals. But unfortunately we are precluded from using it, because chemists have not yet decided on the composition of the precipitate. Rose says that after being ignited, it contains 36.67 per cent

of magnesia, but Thomson says that it contains only twenty-two per cent. In this, however, it would appear, that Dr. Thomson has made a mistake, because he says that caustic ammonia, and phosphate of soda, also biphosphate ammonia, give the same precipitate; but this is impossible, because in using caustic ammonia and phosphate of soda, there is only *one* atom of the acid, which combines with one atom of ammonia, and one of magnesia, to form a subphosphate; and, after ignition, the ammonia having been volatilized, there will remain a neutral phosphate of magnesia, which, according to Dr. Thomson's table of atomic weights, will contain 35.7 per cent of magnesia, which is not much different from the proportion given by Rose. But if biphosphate of ammonia is used, in case the solution does not contain an excess of ammonia, two atoms of the acid will be present, one of which will leave the ammonia, and take up an atom of magnesia, and form a double neutral salt, and not a sub-salt as before. On igniting this precipitate, an atom of the ammonia being volatilized, there will remain a biphosphate of magnesia, containing 21.7 per cent of magnesia. We may therefore conclude that Dr. Thomson has been in the habit of using biphosphate of ammonia always as a precipitate, and that there are *two* insoluble double salts of phosphoric acid, ammonia, and magnesia. Dr. Thomson after giving the composition of the ammonia-phosphate of magnesia in his chemistry, remarks—"Riffault analysed an ammonia-"phosphate of magnesia, which would seem to have contained only "half the phosphoric acid in the preceding salt." It contained one atom of diphosphate of ammonia, and one atom of diphosphate of magnesia, which must be the very salt to which Rose alludes. I am informed that Brande, in his chemistry, mentions there are two salts of this kind, and one is composed of

Ammonia	1 atom.
Magnesia	1 atom.
Phosphoric acid	1 atom.
Water	5 atoms.

but between this Riffault's salt, there is a discrepancy—for this, Dr. Thomson says, is composed

1 atom.......	of.........	diphosphate magnesia.
1 atom	of	diphosphate ammonia.
5 atoms.......	of.........	water.

which is equivalent to

2 atoms.......	of	magnesia.
2 atoms.......	of.........	ammonia.

2 atoms.......of........ phosphoric acid.
5 atoms.......of........ water.

Therefore Riffault's salt contained only half the water that Brande's did.

There are points, which if cleared up would be of the greatest service to mineral analysis. How many there are in India, who have ample leisure to devote to such pursuits, and the apparatus required is quite trifling, and might all be packed in a bullock trunk. With all the activity of chemists in Europe, there is still a great deal of work to be done; there are many salts the composition of which has never been examined, and which require no very wonderful stretch of ability to analyse. Why then cannot it be done in India as well as in Europe. Mr. John Griffin, the translator of Rose, in a little work entitled "Chemical Recreations," which is in fact a most excellent treatise on operative chemistry, remarks that "No practical chemist, however young "he may be in the science, can pursue his studies with even a moderate "degree of zeal, without being enabled to add something almost daily "to the existing stock of knowledge. The variety of unrecorded facts "which continually strike the eye of an industrious experimenter is "indeed surprising." Again.—"The notion that a laboratory, fitted "up with furnaces, and expensive and complicated instruments, is an "absolute requisite for the proper performance of chemical experi-"ments, is exceedingly erroneous. In fact the truth is quite opposed "to this opinion."—"For general and ordinary chemical purposes" "says Dr. Henry "and even for the prosecution of new and important "enquiries, very simple means are sufficient: some of the most inter-"esting facts of the science may be exhibited and ascertained, with "the aid merely of florence flasks, of common phials, and of wine "glasses. In converting these to the purposes of apparatus, a consi-"derable saving of expence will accrue to the experimentalist: and he "will avoid the encumbrance of various instruments, the value of which "consists in shew, rather than real utility. It is a curious and in-"structive fact, that some of the most important discoveries in che-"mistry were made by persons who, either from choice or motives of "economy, used utensils of the very simplest characters. The labora-"tory of the great Priestly cost a mere trifle; and it is well known "how savingly Franklin went to work. The student will beware of "procuring the large and showy apparatus which strike his eye from "the lecturer's table, for they are useless to him." These remarks from a man of Mr. Griffin's practical experience, are encouraging enough to the chemist in India, and shew how true the old adage is. "Where there's a will, there's a way." The Laboratory of Dr. W. Prout, one

of the first chemists of the present day, was a carpetted sitting parlour; his laboratory table, a mahogany writing table, and his furnace the parlour grate.

IX.—*On preserving Timber, &c. from the destructive attacks of the White Ant.—By Aliquis.*

The well known effects of corrosive sublimate in protecting objects of Natural History from the attacks of insects, induced me to make a trial of its power of preserving timber, carpets, &c. from the destructive inroads of the white ant,—and I am happy in being able to say that the experiments I made were perfectly successful, and justify the hope that, by the means now recommended, we shall soon drive these destructive insects from our houses—or at all events render their visitations comparatively harmless.

The strength of the solution I used, was one ounce of the corrosive sublimate to one gallon of water, having previously rubbed the mineral up with a little alcohol to increase its solubility;—wood was immersed in the solution for one week, but carpets and cotton cloth were allowed to remain only for two days. The experiments I varied in every possible way—and uniformly obtained the same result, viz., that the white ant will but very partially, if at all, destroy the substance of any thing macerated in the solution, and that, on discovering its nature, they immediately disappear.

With woollen cloth the effects were less decisive, as the solution appears to be unable to penetrate the fibres of the wool, and is partially removed by washing—but under cotton carpets, rush mats, &c. the insects will burrow for the first day or two, and then disappear; and with regard to timber they are even more fastidious, as I have observed in their covert ways, that they had placed a coating of earth between themselves and the wood; evidently anxious not even to come into contact with the poison.

The advantages of preparing wood in the way recommended, are not, however, confined to its immunity from the attacks of the white ant—as it is now generally known that the same preparation (Kyan's patent) effectually resists dry rot, or other decay; and from the power it is known to possess, of coagulating the albumen contained in the wood—and indurating the fibres of the softer and cheaper varieties of timber, and

rendering them immediately fit for use, if cut down even in a state of active vegetation, are circumstances well worthy of public attention. The method, I believe at present adopted, for preserving the wood of public buildings from attacks of the white ant, is by the application of mineral oil; and its effects are but temporary, as it appears to depend upon its disagreeable odour—as it is only by the repeated renewal of the application that the wood is protected—but by using in its stead a solution of the muriate of mercury—no repetition of the process would be necessary—either to guard against the destructive effects of time, or the more sudden and injurious inroads of the white ant.

Its power over cloth is equally beneficial, and it has been found a perfect preservation against mildew.* As few tents become unserviceable from the simple wear and tear of use, I feel assured if the outer cloth alone, where the decay almost invariably begins, were steeped in the solution, it would, at a very trifling expence, add many years to its durability.

With reference to the question whether such an active agent, as we know muriate of mercury to be, could be so extensively used with impunity, and whether would it not, by becoming volatilized, impregnate the atmosphere of the rooms or tent with poisonous qualities, I am not able from personal experience to reply ; but, from experiments which have been made to ascertain that point in England, I do not conceive that any injurious consequences would result from its use—more especially when applied to timber, cotton carpets or tent cloth, as the effects of the mineral upon both of these substances is to enter into chemical combination with them—and repeated washing in no ways diminishes its preservative power. In support of that opinion, I may mention that a vessel was built in England entirely of timber, prepared in the above way, with the sails and cordage also steeped in the solution, and that no inconvenience was experienced by the workmen in preparing the materials, or in building the vessel, or by the crew who inhabited her after she was finished.

The above remarks make no pretension to originality; the subject is one which has excited much attention in England, although I am not aware that it is one generally known in India. In submitting them I have been only anxious to give a knowledge of the facts more extended circulation, in a country where decay of property is so general and so rapid, from causes which muriate of mercury possesses the power of counteracting.

Madura, 1838.

* Vide *United Service Journal* on Kyan's patent.

X.—*Notes illustrative of the Geology of Southern India.—By Lieut.* R. Baird Smith, *Bengal Engineers.*

The universal prevalence of primary rocks, with the general quiescence of the agents of active reproduction, tend to give a degree of monotony to the geology of Southern India, and to deprive it of that interest which naturally attaches to activity and variety. The features of its hills and its valleys alike exhibit indications of the long continued reign of the decomposing and abrading powers of the natural world. The fantastic turret-like peaks, the results of the unequal disintegration of the granitic masses of which they are composed, so frequently crowning the summits of the one, are the trophies of ages of resistance on their part to atmospheric encroachments, while the boulder-like masses and crumbling deposits met with in the other, tell the same tale of long resisted but yet resistless power. But amid these signs of decay we see nothing of those active reproductive agencies which so abundantly characterise more diversified regions. No great rivers are seen bearing on their waters the fragments of one continent to re-create or increase another; no inland lakes or seas are gradually passing away from the face of the earth, year by year perceptibly approaching the time when fruitful fields will replace their "waste of waters," and when their solitude and silence will yield to the glad voices of the labourers rejoicing in the luxuriance of these new born lands.

Equally quiescent are all igneous agents, for no volcanoes are here in active operation, and the existence of subterranean forces is only occasionally indicated by slight tremblings of the earth within very limited districts. Yet even with this monotony, the geology of Southern India is not devoid of interest, since its very peculiarity in having been so long free from any powerful disturbing agents, either aqueous or igneous, has admitted of the full display of those phenomena which result from the unchecked sway of the decomposing influence of atmospheric agents. These are neither trivial nor uninteresting, since to this source there seems now but little doubt that the formation of the laterite, so long an apple of discord among the observers of Southern India, is to be traced. A mass of observations gleaned from many well developed lateritic localities, both on the coast and inland, have recently been made public in an interesting paper on this formation by Dr. Clark, H. M. 13th Dragoons; and by the careful examination and discussion of these, the question of its origin seems to me to be satisfactorily answered. Before this paper came to my knowledge, a conviction that

the laterite was the result of the aggregation of the decomposed constituents of the rocks which it usually overlies, was forced on my mind by observations in several of those identical localities whence I find Dr. Clark has gathered a considerable portion of his information; and it was with pleasure that I found a conclusion, based on limited data, supported by an examination so extensive and so ably conducted as that of Dr. Clark. In the vicinity of Bangalore, where both the lateritic and lithomargic formations are largely developed, an opportunity was afforded me of studying them in detail. Many of the protruding masses of sienitic granite and gneiss, which are the prevailing rocks, exhibit nature as it were in the simultaneous acts of decomposition and aggregation. Their surfaces are usually covered with a coating of dark coloured and weathered matter resulting from the felspar or hornblende, studded with small undecomposed and ferruginous pebbles of quartz, while round their bases the laterite forms a regular talus of variable size. It is usually of the compact quartzose and distinctly marked variety: sometimes however it assumes the cavernous or vesicular structure, the dark red matrix exhibiting a series of small cavities. One example was of peculiar interest, for, in consequence of the existence of a basin-shaped hollow in the side of the rock, the materials necessary for the formation of the laterite had collected there and a small nest of it formed. The circumstances of the case excluded from consideration both the aqueous and igneous causes, whose aid has usually been called in to explain the origin of laterite, and the clear evidence of its being due to the slow but certain operation of atmospheric agents amounted to demonstration. The bewildering effect of a multiplicity of contending opinions, gives to such simple yet well marked observations on the point at issue, additional value and interest.

As the resultants of decomposition, it is natural to expect that the character and composition of both laterite and lithomarge will be very variable, since the constitution of the parent rocks will necessarily influence that of the derivatives. Hence it has been found by observation that those rocks in which the proportion of quartz to felspar and hornblende is considerable, decompose into laterite, while those in which quartz is less abundant usually exhibit the lithomargic character. The same specimen sometimes presents both of these formations, the one passing imperceptibly into the other, and clearly establishing the position that they are effects of the same cause modified by concomitant circumstances. These circumstances are externally the variations of heat and moisture, and internally the greater or less degree in which the constituents of the rocks predispose them to be affected by the

oxidising influence of the atmosphere. Throughout nearly the whole of Southern India sienite prevails, and with it laterite is very generally associated. But sienite contains hornblende as one of its principal ingredients, and the large quantity of oxide of iron this contains peculiarly disposes it to yield to atmospheric action. Hence then follows the disintegration of the mass; the felspar furnishes the alumina necessary for the matrix, and the quartz resisting decomposition, and becoming ferruginous from the infiltration of the iron, forms the imbedded pebbles, and thus a laterite results. Dr. Clark from his own observations has subdivided the laterite into three classes, the lithomargic, the quartzose, and the detrital. The first is distinguished by the large quantity of lithomargic earth present in it, which deprives it almost wholly of tenacity, and gives it a cavernous appearance; the second, by containing numerous rounded pebbles bound together by a clayey cement, occasionally also cavernous; the third, by being merely a congeries of pebbles not firmly aggregated, but yet exhibiting the features of laterite. My own observations induce me to believe that this classification will include nearly the whole of the varieties of this very variable formation, as I have never met with any prominently beyond its range. To Dr. Clark's most interesting paper* I would refer those, who may wish to see the grounds, on which the present theory of the formation of laterite rests, fully illustrated; my sole intention in alluding to it having been to confirm the accuracy of his observations on those localities which we had similar opportunities of examining, and to contribute my limited store of facts for the elucidation of a point which has so long engaged the attention of geologists.

The depth to which the decomposing influence of the atmosphere will reach, even through the solid rock, is well exhibited when sections are exposed in excavations, an opportunity was afforded me for observing during the sinking of a shaft for a mine in the vicinity of Bangalore. The lithomargic earth commenced at eighteen inches or two feet from the surface, and, as the excavation proceeded, the sides of the shaft exhibited it beautifully variegated in colour. At about 15 feet it began to get slightly more tenacious, and the felspar appeared as white earth. Gradually to the depth of 20 feet, the rock approached nearer and nearer to its natural undecomposed state, though even at that depth it was still crumbling. When the excavation ceased at about 22 feet, the rock seemed to be pegmatie, as nothing but quartz and felspar were distinguishable, and, judging from its appear-

* Madras Journal of Science, December, 1838.

ance, the atmospheric action had probably reached a farther depth of 8 or 10 feet, making in all from 30 to 35 feet of solid rock penetrated by this destroying power.

It may be mentioned as an interesting fact, that the contents of the excavations in this vicinity were frequently auriferous, and small quantities of gold were obtained by washing. This is by no means an unfrequent occurrence in the Mysore country. In blasting sienite at Chinapatam, a village about 40 miles from Bangalore on the road to Seringapatam, I occasionally observed considerable quantities of gold disseminated in small particles over the fractured surfaces; and, at one time, in the vicinity of Wynaad, this metal was obtained from a rich yellow earth, in quantity sufficient to employ a number of labourers, and to yield some return.

Travelling eastward from Bangalore towards Oossoor, the country presents but little either of natural beauty or scientific interest. The beds of the nullahs occasionally exhibit a variety of laterite, whose formation seems to have been materially due to the transporting agency of water. The prevailing rock being the sienitic granite, its decomposition has supplied a large quantity of quartzy pebbles, which are strewed over the fields in every direction. A rush of water after heavy rains transports these to the adjoining nullahs, whose clayey bottoms form a matrix in which they become imbedded, and during the dry season the whole hardens into a compact mass, exhibiting the characteristics of one of the varieties of the laterite. Detached and water-worn fragments of the other varieties were occasionally met with, but no extensive deposits were observed in situ.

The hills in the vicinity of Oossoor were found to be composed of the universal sienite, exhibiting occasionally with the addition of mica the striated appearance of gneiss. Large veins of pure white quartz and dykes of greenstone traversed the main rock in different directions, without however having caused any alteration at the planes of junction. In many places the sienite had completely decomposed the hornblende into a dark red impalpable earth, and the felspar into a similar white one; the quartz was in ferruginous pieces, undecomposed, with highly vitreous lustre and splintery fracture.

Passing from Mysore into the Barramahal district, the primary rocks still prevail. The features of the adjoining country are now, however, altered, and the comparatively flat and uninteresting plain is exchanged for mountain scenery at once bold and beautiful. Lofty and precipitous hills rising abruptly from the plain, sometimes clothed with rich verdure and covered with trees and shrubs to their summits, at other times presenting scarcely one solitary green spot to relieve their desolate and

rugged nakedness, bound the view on every side, and the traveller, following the road which winds along their bases, passes through a series of valleys where, kaleidescope-like, each turning brings new beauties before him. On approaching Kisnagherry, the principal town in this district, the distant hills occasionally exhibit the ribbed-like appearance characteristic of columnar basalt. The town itself is overhung by one of these, but an examination of it, effected with considerable difficulty and risk, proved that the ribbed appearance was due, not to the existence of columns, but to linear deposits of earthy and fungoid matter, the dark colour of which, alternating with the natural colour of the rock, produced when viewed from a distance exactly the effect of a columnar arrangement. These deposits were formed along the lines by which little streamlets of water trickled down from the summit of the hill, these having doubtless led to the partial decomposition of the rock, and the formation of soil sufficient for the fungi to vegetate in. Nests of hornblende and greenstone were abundantly met with, and the whole of the sienitic mass was traversed by veins of pure quartz.

The cause of the constant occurrence in primary formations of these segregations of simple minerals in the rocks of which they form constituent parts, is a most interesting, but as yet unsolved question, and one attended with peculiar difficulties when experimentally investigated, from the circumstance that the phenomena in question require periods of such extent for their development, as to make it impossible to institute in the laboratory any experiments which would be strictly, and in all points analogous to what obtains in nature. In their original state of igneous fluidity, the operation of the attractive affinities of the molecules of which the different minerals forming granitic rocks are composed would be free and uninterrupted, as has been satisfactorily shewn by the "pyrochemical" experiments of Maesterlich, and others, who have succeeded in obtaining crystals of the minerals alluded to, from the igneous fusion of their constituents. But, the obtaining of these in their crystalline state, only as detached and individual substances, leaves us still in doubt as to the causes of some of them occurring massive and disseminated. Thus, among others, a curious and most interesting fact stated by Mr. Babbage in his "Economy of Machinery," appears to warrant the conclusion, that such segregations take place when the substances are in a state of aqueous fluidity; for he remarks, "Flints after being burned and ground are suspended in water in order to mix them intimately with clay, which is also suspended in the same fluid for the formation of porcelain. The water is then in part evaporated by heat, and the plastic compound, out of which our most beautiful

porcelain is made, remains. It is a curious fact, and one which requires farther examination than it has received, that if this mixture be suffered to remain long at rest, before it is worked up, it becomes useless: for it is then found, that the silex, which at first was uniformly mixed, becomes aggregated together in small lumps. This parallel," he adds, "to the formation of flint in the chalk strata deserves attention."* Could an analogous observation to this, on the aggregation of the constituents of minerals in a state of igneous fluidity be obtained, a most important light would be thrown on their occurrence in detached and massive portions in rocks of igneous origin. In the present, as in many other instances, geology must claim this boon from the sister science of chemistry.

At Mallepandy, a village about ten or twelve miles from Kisnagherry, a beautiful specimen of epidote, of the usual dark green colour, was found imbedded in a mass of true granite, which was here observed, though not to any considerable extent. The sienite was found to be peculiarly large grained, and the crystals both of the hornblende and felspar distinctly defined; on one fragment of the rock, which had been precipitated from the higher ground, a large quantity of iron pyrites in cubical crystals was observed. The country between this village and Wanianabaddy presents the same general features, veins of porphyry outcrop at about a mile from the latter place, exhibiting occasionally small nests of chlorite. The road in many places passes over the underlying granite, which is more abundant here than usual, and the large quantity of mica scattered over its surface causes it to glitter in the light of the sun like burnished silver. Many water-worn fragments of different rocks, greenstone, basalt, compact and vescicular, reddish coloured sienite, so small grained as readily to be mistaken for sandstone, are found strewed over the sandy plain surrounding Wanianabaddy. They are brought most probably from the distant hills by the Palar river, which during the moonsoon comes down with great violence, and often devastates the adjoining country.

The aspect of the valley between Wanianabaddy and Amboor is monotonous and uninteresting. At the latter place I was much interested by the marked development of the phenomena of crystallisation in the structure of the trap dykes, which traverse the neighbouring

* Note. Will carbonate of lime treated as above with alumina segregate similarly to silex? If it does, then may not the occurrence of layers of nodular kunkar in clay be explained on the same principle as the occurrence of like layers of flint in chalk? The question admits of an experimental reply, and an effort to obtain this is now in progress. R. B. S.

hills in great abundance. It is unnecessary however to describe these in detail here, as I have elsewhere done so at considerable length.* It may therefore suffice to remark, that the trap, invariably, on being fractured, exhibited cleavage planes, and separated into obtuse angled rhomboids; that fissures traversed the dykes always at right angles to the cooling planes or sides of the including sienite; that the direction of cleavage was perpendicular to that of fissures; and that the trap was evidently altered at its planes of junction with the sienite. In attempting to trace the cause of these phenomena we are carried to the unexplored domain of modern science, for their development is dependant on the action of molecular forces, whose origin and mode of operation are alike enveloped in much mystery. Mathematical analysis† has been successfully employed in demonstrating that, granting certain postulates, the phenomena of crystallisation may result from the adjustment of electrical forces; and observation tends apparently to confirm such a theory, by shewing that crystals do actually result from the action of forces derived from this source. But, we are still required to apply these conclusions with diffidence, as their verification cannot yet be considered as effected. The existence of electricity during the passage of trap dykes from their original state of igneous fluidity to that in which they now exist, may safely be concluded, from the experimental truth, that variation of temperature is one of the most fruitful sources of this agent; and should it ever be satisfactorily shewn that a subjection to electric agency confers on the particles of matter that peculiar polarity, which disposes them to group themselves in determinate figures, and under determinate laws, no element will be wanting for the application of such a principle of explanation to the present case.

The plain of the Carnatic is diversified by the occasional occurrence of connected, as well as detached hills. A peculiar feature is to be remarked in several of those in the immediate vicinity of Vellore. Individual hills are observed to rise abruptly from the plain, like islands in the midst of an ocean of sand, of the most perfectly conical shape, and wanting only the crater, with its accompanying cloud of smoke, to complete their resemblance to existing volcanoes. These hills are usually at some distance from the connected ranges, and as an explana-

* "On the crystalline structure of the trap dykes in the sienite of Amboor, &c. &c." Madras Journal of Science, July, 1839.

† M. Mosotti sur les Forces qui regissent la constitution interieures des corps Whewell's Hist. of *Induc. Science*. *Sommeville Conn. of Phys. Science.*

tion of the peculiarity, it might be conceived that the upraising force had in the one case acted on a line to produce the range, while to produce these insulated and conical hills it had been concentrated in a focus or point.

At Palleconda, a small town about 14 miles south-west of Vellore, I crossed a tract of country which has been described by Dr. Benza, an observer who has added considerably to our knowledge of the geology of Southern India. The plain on which the town stands is sandy, and strewed over it there are many weathered masses of sienite, which natural sections, afforded by the deep nullah beds, prove to be the underlying rock of the whole. Traversing this there are as usual dykes of trap and porphyry. The latter is of a peculiar kind, the porphyritic crystals being of felspar imbedded in a matrix of quartz. Investing a portion of this quartz-porphyry, were found crystals of an ore which I am inclined to believe was specular iron ore. Its characteristics were highly metallic, inclining to adamantine; colour dark grey, nearly black; hardness between 7 and 8; fracture splintery; structure laminated; specific gravity not numerically determined, but high; crystalline form a flat rhomboid. In the adjoining hills felspar of the sienite was occasionally of a pink colour, and dendritic on the surface. Transported masses of greenstone, basalt, mica, and clay slate were found in the vicinity of the streams, though none of these rocks were observed in situ.

The country between Palleconda and Vellore, while it exhibits no variety in geological structure, is interesting from the singularly wild and beautiful character of its mountain scenery. On the summits of the hills the tor-like masses of the sienite are grouped in the most varied forms, sometimes shooting up like spires, at other times strewed around like the ruins of some extensive edifice, or again standing square and solid, like the massive walls and donjon keep of some robber chieftain's tower. The valleys are covered with similar blocks piled on each other in the wildest confusion, the whole seeming to tell of mighty convulsions, rather than of the slow and scarcely perceptible operations of the agents of disintegration and decay.

A monotonous and uninteresting plain, with but little to attract the attention of the geologist, extends from Vellore to Madras. The same sienite which forms the distant hills underlies the whole of this plain, outcropping at several points. It was met with immediately under the sand during the progress of an artesian well sunk in the immediate vicinity of Madras, which after passing some little distance through the rock was abandoned; and indeed it is singular that, consi-

dering the geological configuration of the district, it was ever undertaken at all, since it is scarcely possible to conceive one less calculated for the success of such an attempt. The immediate succession of a close grained, hard, compact, primary rock of unknown thickness to a bed of porous sand, would effectually prevent the percolation of water to any depth exceeding that of the sand itself, and consequently the formation of those interior reservoirs on which the economical value of artesian wells depends. There are no porous strata beneath the sienite, nor is the sienite itself a cavernous rock like certain limestones in which water may collect in large basin-shaped hollows; hence the attempt must have been made with but little consideration of the principles by which such operations ought to be guided, and hence also an additional motive for the encouragement of the study of a science which promises to obviate such unnecessary expenditure of materials, money, and time.—*Calcutta Journal of Natural History, vol.* 1, *pp.* 188—199

Calcutta, 9*th April*, 1840.

XI.—*Geological Features of the Himalayan Mountains.*

(*From* Royle's *Illustrations of the Botany, &c. of the Himalayan Mountains, Supplementary Part*).

Having noticed the extent and physical features of the Indian empire,* we might proceed to describe the materials of which its mountains and its plains are composed, as well as the soils produced by their disintegration. But the most cursory notice of the Geological features of so extensive a field would require more space than can be allotted to the subject; the Author must, therefore, confine himself to the part with which he is best acquainted, and which can be elucidated by his specimens and observations, which have attained some value from the kindness, as stated in the Preface, of his friend Mr. De la Beche. But the sections† can only be considered as giving a general idea of the dip, direction, and nature of the formations met with. The sections of the Himalayas correspond with that given, as far as it goes,

* In the "Introduction" to Professor Royle's *Illustrations*,—an abstract of which will be found at page 151 of No. 12 of this Journal.—Editor.

† "*Illustrations*," Plate 1.

by Dr. Falconer, in his Report on Tea cultivation, though he informs me that mine are erroneous; in the parts near the Snowy Peaks, where the Author relied for his information on Capts. Herbert and Hodgson, as, instead of consisting of gneiss, they are formed by one of the grandest outbursts of granite in the world. The sections of the Central range of India, from Sherghatty to Roghonautpore, formed by Mr. De la Beche, from the Author's specimens and observations, correspond with that previously published by the Rev. Mr. Everest, in 1831, in the third volume of the Gleanings of Science.

The great Gangetic valley consists of an extensive plain, which is very gradual in its slope from Saharunpore to the Sunderbunds, v. p. x. The structure is not easily detected, from the universal flatness, and the horizontal nature of the depositions, while water being near the surface, wells, the only works, reveal only a few feet in depth below. The surface soil is generally sandy, with a varying proportion of clay, which predominates in the substratum, and is in most places sufficiently pure for making bricks. Calcareous particles are intermixed with the soil and substratum in most parts. These in many places assume the form of spongy cavernous nodules: in some the form of stalactites or of roots, and are then apparently of modern origin; in other places they are in masses sufficiently large to be worked and used as a building stone. But the nodular appearance is the most remarkable, especially from the nodules being so abundant in some places, as to cover the soil, and give the appearance of the surface being covered as if with a fall of large hail-stones. This forms the extensively diffused *Kunkur* formation of India.

In Calcutta, in deepening a tank, a group of full-grown trees were found standing erect, and apparently lopped off, three or four feet above the roots. In boring for water, rubbish and mould were first met with, then sandy clay, and, at twenty feet, a vein of pure sand, the source of the common springs of wells. Blue clay, with sand,—then black, above a stratum of peat; with pieces of wood, that of the Soondree, and at sixty feet, Kunkur nodules; reddish well-sand at seventy-five feet, whence the river springs rise. Clays and sands, with some Kunkur, are found below this: a quicksand at 120 to 136 feet; and at 176 feet, quartzy sand and granitic gravel; and from 350 feet below the surface of Calcutta, the auger brought up a fossil bone, which is figured in J. A. S. for March 1837. At Benares, Mr. Prinsep, in cutting a tunnel and sinking shafts, found, fifteen feet below the surface, a number of half-quarried stones of a large size, on what he conceives must formerly have been the level of the ground; at thirty feet, some kunkur

was met with. At Saharunpore, in digging a well, after ten feet, coarse moist sand was found, mixed with round pebbles, chiefly of quartz, and about twenty feet from the surface, pieces of kunkur or tufaceous limestone, were raised, together with dicotyledonous wood, apparently of one of the Coniferæ. At Bihut, twenty miles north of Saharunpore, Capt. Cautley discovered the site of an ancient town seventeen feet below the present surface of the country. The Indo-Scythic Coins which had been entombed in this oriental Herculaneum, Mr. Prinsep refers to the commencement of the Christian era. Capt. Cautley is of opinion that the enormous discharge of sand, clay, and shingle from the lower hills during the periods of the rainy season, are gradually causing a rise of the country skirting their base, and to this and the action of wind on sand, he ascribes the inhumation of this ancient city. The structure of the plains may also be seen in the raised hills which skirt the base of the Himalayas, and the banks of the Jumna afford a very interesting series of sections, of which the structure may be treated of either with that of the Gangetic valley or of Central India, as some of the peculiar formations of the latter seem to extend even to the beds of that river.

Proceeding from the plains of India to ascend the Himalayas, we every where meet with a lower range of hills, which have been variously denominated " the Lower Hills, the Sandstone, Sub-Himalayan or Sewalic Hills." These hills, in many parts, rest immediately upon the Himalayas, but in others are separated from them by a series of longitudinal valleys. The part with which the Author is best acquainted is the direct road from Saharunpore to Deyra and the Himalayas, through the Kheree pass, which is the broad, generally flat, stony bed of a hill stream, ascending by degrees to the crest of the pass, now much cut down, but from which there is a gradual descent to the valley or Doon of Deyra. Along this pass flows in a winding course a small stream of very clear water. On either side, and about fifty yards apart, arise the hills, and, according to the windings of the stream, are seen sometimes sloping, sometimes abrupt; in the former case, covered with vegetation, in the latter, presenting a barren and precipitous display of their stratified structure. These strata dip to the N.E. or towards the Himalayas, at various angles from 20° to 38°, and the hills display every variety of appearance, partly from the destroying effects of water on so destructible a material, and partly to this being sometimes defended from its influence by a covering of a boulder stone. They are formed by a succession of parallel ridges, abrupt towards the plains, and sloping towards the Himalayas. In many places, each hill, if separa-

ted, might be represented by a right angled triangle, the base resting on the pass, the perpendicular facing towards the S.W., and the hypothenuse sloping towards the N.E., and corresponding in dip with the strata. This side is sometimes continued to the level of the pass; at others, another hill, with its perpendicular side, seems to arise from the middle of the last, and is itself, in like manner, succeeded by a third, forming a succession of abrupt and sloping sides, like the teeth of a saw. At Hurdwar, the sandstone character is complete, and the rock is sufficiently hard to be used as a building stone. About fifty or sixty feet were cut through to make a road between the river and the hills, by Capt. De Bude, of Engineers, at the back of whose house, on the Hill, rolled stones might also be seen lying upon the sandstone. These hills are composed of a series of clays, of a loose-grained sandstone, with much mica interspersed; beds of gravel and rolled stones, which consist of the debris of every variety of rock: as granite and trap-rocks, limestone and clay-slates, gneiss, micaceous and hornblende schists; in fact, of all the rocks of which the Himalayas are composed. Carbonate of lime is interspersed throughout the formation, forming stalactites and encrusting leaves, &c. Carbonate of soda is also found effloresced in many situations. In some moist situations the boulders are sometimes so soft, that quartz crumbles in the hands more easily than a piece of sugar.

The gravel and boulders found on these hills are very extensively diffused. They are abundant in the series of longitudinal valleys which are bounded to the S.W. by the Sandstone range, and on the N.E. by the Clay-slate formation of the Himalayas. These have been enumerated by Capt. Herbert as the Mokowala or Ropur, Pinjore, Kyarda, Deyra, and Patle, all between the Sutlej and the Gograh, and again, that of Chetuan, which lies to the north of Bettiah. They are from twenty to twenty-five miles in length, and of variable breadth, the widest being about fifteen miles. They have two outlets for their drainage, and their highest level is usually near the middle. The surface is level or undulating, intersected by ravines, or river beds; the rock is seldom seen, except on their boundaries. The soil of the Deyra Valley, in most of the uncleared parts, as well as in many of those long cultivated, is intermixed with these rounded pebbles and boulders, which are also found at great depths. In the well dug by the Hon. Mr. Shore, they were brought up from two hundred and fifty feet; but I observed that those from the greatest depths were angular, and composed of clay-slate and limestone similar to that of the nearest, or Mussooree range; but like the shingle of the Sandstone range, or that

found in the beds of rivers, they are usually composed of every variety of rock. Though so deep in the centre of the valley, the debris thins off towards its extremities, where the sandstone is seen underlying the beds of shingle; these boulders are also found filling up the valleys of the great Himalayan rivers, as those of the Ganges, Jumna, Tonse, Pabur, where flat terraces of considerable extent, sometimes cultivated, may frequently be seen, composed chiefly of great masses of boulders, with gravel and sand, with the river flowing at some depth below the flat terrace, and through which it appears to have cut its way. These exactly resemble the boulders in the channels of the rivers, or those found in the longitudinal valleys, or on the Sandstone hills, and may be traced, but smaller in size, to considerable distances: that is, to twenty or twenty-five miles in the plains, as may be seen in digging wells. They would be displayed in the same way as the Sandstone, or Sewalic range, if any portion of the present plains were by any means to be raised from their horizontal into an inclined position.

This Sandstone range may be traced along the plainward base of the Himalayas, from Roopur, on the Sutlej, to the foot of the Siccim Hills, in lat. 26½° long. 88½°, where it was recognized by Capt. Herbert, in his trip to Darjiling. Dr. Buchanan, in entering Nepal in long. 85°, describes the Hills as composed in general of clay, intermixed with various proportions of sand, mica, and gravel, disposed in strata, either horizontal or dipping towards the north, at an angle less than 25°, and that incrustations are abundant, from the deposition of calcareous matter, also lignite. The prolongation of these Hills from the Kalee to the Sutlej, or from long. 80½° to 76½°, has been minutely examined by Capt. Herbert, when employed on the Mineralogical Survey of the Himalayas, and their structure found to correspond with what has been described, and lignite found throughout. The dip is usually to N. E.; at Chikoom S. W.; but between Chilka and Dikoolee the beds are almost horizontal. At Hurdwar and Chandneepuhar, on opposite sides of the river, the strata dip in opposite directions. On the N. E. side of the Deyra Valley, in ascending to Mussooree, by Beejapore, I found the sandstone dipping S. W., at an angle of 25°, and at Kalsee sandstone is also observed dipping to the S., and gradually passing to a dip E. by N. Capt. Cautley has observed, that though we may, on a large scale, lay down the dip and direction with accuracy, the former as varying from 15° to 35°, and the latter from N. E. to. S. W., local details give very different results, and that near Nahun the mass of mountains have been upheaved from a variety of centres, as if the upheaving power had been exerted irregularly over the face of the district. He

has observed a section which gives an anticlinal point under the village of Derria, on the Murkunda river. My observations also give irregularity of dip in the mountains in the vicinity of Nahun.

The elevatory force does not any where appear, by which these hills have been raised from the horizontal position in which they must have been deposited, into their present inclined one; but Dr. Falconer and Capt. Cautley have both seen appearances of trap in the neighbourhood of these disturbances. My specimens and observations indicate its vicinity on the northward of Nahun; also in the vicinity of Kalsee, and in the ascent to Mussoree by Kuerkoolee. The nearest points to the southward where indications of trap are seen, are in the bed of the Jumna, and one of these is alluded to by Col. Sykes (Proc. Geol. Soc. Jan. 1832), when tracing the trap formation to the north, which I observed in a small island called Oudhar, below the village of Kuttea, and about three or four miles higher up the river than the Seeta Puhar, and about thirty miles above Allahabad, and therefore near Mhow, which is twenty miles below Murka, the two localities where volcanic rocks have been noticed by Mr. Dean, in the Journal of the Asiatic Society.

These hills have, however, in the last few years, attained great celebrity, from their containing one of the most extensive deposits of Fossil remains, which has any where been discovered, and which have been made public by several officers of the Bengal Army, whom I am proud to call my friends: as Dr. Falconer, my successor at Saharunpore; Capt. Cautley, Superintendent of the Doab Canal; Lieuts. Baker and Durand, of the Bengal Engineers, in a series of excellent Papers in the Researches and Journal of the Asiatic Society of Calcutta, and in the Transactions of the Geological Society of London. To the two former, this Society, the fountain of Geological honours, awarded two Wollaston Medals, in February 1837, for their discoveries in Fossil Zoology, especially as displayed in their description of the *Sivatherium giganteum*,* a huge Ruminant, which, they conceive, serves to fill up the blank which has always intervened between Ruminant and Pachydermatous quadrupeds, for it combines the teeth and horns of the former with the lip, face, and probably proboscis, of the latter. Lieuts. Baker and Durand are entitled to hardly less credit, for their Papers on the Fossil Horse, Hyæna, Bear, &c., and for having had the skill to detect, and for being the first to have the boldness to publish, in their Paper in the Journal of the Asiatic Society of Calcutta for November 1836, the dis-

* See No. 12 of the Madras Journal for a description and representation of this fossil. —Ed. M. J.

covery of Fossil Quadrumana. This was two months previous to the presentation, on the 16th January 1837, to the Academy of Sciences at Paris, of a Memoir, by M. Lartet, respecting the discovery of the lower jaw of an ape, in the tertiary fresh water formation of Simorre, Sansan, &c. in the department of Gers, in the south of France, and at the foot of the Pyrenees, and which in its genera so closely resembles that of the Fossil Sewalik Hills, found, it is curious, in the district of Sirmore. These dates are adduced, because Dr. Buckland, in the Supplementary Notes to his Bridgewater Treatise, has announced M. Lartet as the first discoverer of Fossil Quadrumana. It is highly creditable to the Bengal Army that the only four officers in that part of the country should each and all have so highly distinguished themselves, in a science foreign to the pursuits upon which they are employed by the Indian Government, but which they have treated so as to merit the applause even of those who have made Fossil Zoology the business of their lives, v. Mr. Lyell's Address to the Geological Society in 1837.

The discovery of Fossils in the Sewaliks is recent, and its history easily traced; but it is difficult to ascertain who first discovered them in any part of the Himalayas. The Gunduck has long been known to bring down Fossil Ammonites, which are called *Saligrammi*, and are much esteemed by the Hindoos. The Fossils represented in the upper part of plate 3,* from the elevated land on the N.E. of the line of Snowy Peaks, have also been long known in India by the name of *Bijli ke har*, or *Lightning Bones*, being employed by the natives in medicine. Capt. Webb and Mr. Traill were probably the first to bring them to the notice of the public; the specimens figured are from the collection of the Geological Society, having been presented by Mr. Colebrooke, to whom they had been sent by those gentlemen. The fossil shells figured in the lower part of the same plate,† are due to the researches of the late Dr. Gerard, who, I believe, first discovered them in the elevated valley of the Spiti, N.W. of Kunawur, though the date when, is not well ascertained; several, however, were figured at Calcutta in the Gleanings of Science for September 1831, where Capt. Herbert's paper on the Geology and Fossils of the Himalayas is published.

These fossils are all from the northern face, beyond what may be considered the true Himalayas. Nothing had then been discovered on the southern aspect of the mountains, with the exception of some at Caribari, in the small state of Cooch Behar, on the banks of the Brahmaputra, which were noticed by Mr. Colebrooke, in his account of the

* Illustrations. † Do.

Geology of the N. E. border of Bengal. But this point was so remote from the parts of the Himalayas usually visited, that it was long before it was discovered that they formed a true clue to the nature of the formations at the base of these mountains. The Author also, in December 1831, discovered some fossil fragments on the banks of the Jumna, which, though at first doubted, were afterwards proved to be such by chemical analysis, v. J. A. S., p. 457. Abundance of fossils have since been discovered there by the engineers employed in improving the navigation of the Jumna: v. papers by Capt. E. Smith, and by Mr. Dean, J. A. S. ii., p. 622, iii., p. 302, iv., p. 261.

Dr. Govan, in September 1831, discovered some Himalayan limestone which bore the impression either of a reptile or of one of the crustacea, which has not yet been described, but with this exception, nothing had been found on the southern face of the Himalayas, or from the plains to the Snowy Peaks, and yet diligent search had been made for fossils in the Sewaliks themselves, but chiefly from the Kheree Pass to Hurdwar, by Capt. Herbert, and by Mons. Jacquemont at Nahun and in the Kheree Pass, as professed geologists; by Capt. Cautley and the author in their occasional visits to the latter and to Hurdwar. Capt. De Bude of the Engineers, when cutting down the rock at Hurdwar, and the shingly summit of the Kheree Pass, had been requested to look out for any appearance of fossil remains; and one of the officers of the Engineers, who has since distinguished himself in such discoveries, almost threw himself upon what he conceived to be a deposit of fossils, when the police officer who is stationed near the head of the Kheree Pass came up and informed the party that a camel had died there in the previous year. Lignite had been discovered here, and described by Capts. Herbert and Cautley. To this the author projected a visit, before leaving that part of India, with Dr. Falconer; but, as time was wanting, the latter went alone, and "returned loaded, not only with lignite, but with noble fossils of the monsters of the deep; bones of crocodilidæ, fragments of the shell of large turtles, and a fragment of a bivalve shell as large as an oyster."—Journ. As. Soc., i. p. 97,—as announced by the author in some notes read to the Asiatic Society in February 1832, when he was led to inquire whether those fossils did not probably belong to the same formation as those discovered by Dr. Wallich and Mr. Crawford on the Irawady. No further progress seems to have been made until April 1834, when Dr. Falconer picked up the shell of a fossil tortoise in the Timly Pass; Capt. Cautley immediately proceeded to the Kaloowala Pass, where he had discovered the lignite in 1827, when Dr. F. recognized a bone, and in the course of

the digging, they found teeth of crocodiles; shells of tortoises; teeth, apparently of squalus; and bones and teeth of a pachydermatous animal, apparently Anthracotherium. The lignite lies between two beds of marl, or clay conglomerate; and in the upper of them the remains were found. Lieut. Durand, in September 1834, met with this marl, or clay conglomerate, on the north face of Nahun, with tortoise, Saurian, mammal, and fish remains.

But this discovery was eclipsed by that of the more extensive and important deposit of remains of fossil mammalia on the same range of hills to the westward of the Jumna, to which the duties of the Canal officers often led them. Attention was directed to this by Lieut. Baker having had given him, by the Nahun rajah, the fossil tooth of an elephant (Elephas primigenius) which had been picked up at Sumrotee, near the Pinjore valley. Lieut. B. proceeded to the Ambwalla Pass, on the western side of the Jumna, and found a large bone of some huge animal; Capt. Cautley, with his characteristic zeal, immediately joined Lieuts. Baker and Durand; when they carefully examined the ravine and slip, and brought away from the *upper strata of sandstone* seven fragments of bone, some of very large elephants, and the tibia, apparently, of a camel. A thin bed of blue clay, or blue marl, underlying the sandstone, and dipping at an angle of 20° to 30°, was found full of fresh water shells, as of Planorbis and of Paludina, v. Journ. As. Soc., iii. p. 393.* Specimens were also procured from other parts of the range, proving that from the Jumna to the Pinjore valley these mountains abound in fossils; and, in March 1837, Dr. Falconer announced the discovery of a few of the same fossils near Hurdwar, and in large quantities to the eastward of the Ganges in the low hills which skirt the province of Kemaon. Since then, the progress of discovery has been rapid, and is fully recorded in the works quoted. A more particular account of the localities, with sections of the mountains, is given by Capt. Cautley, in his paper read to the Geological Society (9th March 1836), and published in the Transactions, 2d Series, vol. v., p. 267, to which I gladly refer, and have only to give a brief enumeration of the genera and some of the species which have been discovered in the Sewalik hills. Capt. C. states particularly, that to the westward of the Jumna these hills are less abrupt; gravel beds are less frequent and abundant, and they are composed of varieties of clay-

* Though the Author refers to the Journal of the Asiatic Society, &c. as showing the publication of the information, yet he quotes chiefly from letters addressed to him by Capt. Cautley, and which are those referred to by Mr. Lyell in his address in presenting the Wollaston medal, in 1837, to the Author, to be forwarded to Capt. Cautley and Dr. Falconer.

slate, and quartz, which can be traced to the neighbouring and nearest mountains. He distinguishes the lower marl strata from the upper sandstone beds.

List of Fossils found in the Sewalik Range, *by* Messrs. Falconer, Cautley, Colvin, Baker, *and* Durand.

QUADRUMANA.

Three species of Quadrumana, v. Messrs. Baker and Durand, Jour. Asiatic Soc. Calcutta, Nov. 1836, Tab. 6, fig. 2; Messrs. Falconer and Cautley, J. A. S., May 1837. One allied to Semnopithecus.

PACHYDERMATA.

Elephas primigenius.

Mastodon elephantoides { M. *latidens*, Clift. — *Elephantoides*, Clift. }

——— angustidens.

Hippopotamus sivalensis, F. & C., v. Tab. 6. fig. a. b.

——— dissimilis, F. & C.

Anoplotherium posterogenium, F. & C.

Rhinoceros angustistrictus, F. & C.

Rhinoceros sivalensis, F. &. C., v. Tab. 6, fig. 4, a. b.

Anthracotherium silistrense, v. Tab. 3, fig. 12—15.

Chærotherium, F. & C., sivalense, F. & C.

Sus, (sp. undetermined).

RUMINANTIA.

Sivatherium, F. & C.

——— giganteum, F. & C., v. tab. 6, fig. 1, a., b., c., d.

Camelus (sp. undetermined: two undoubted).

Cervus, (sp. undetermined: numerous).

Antilope, (sp. undetermined: numerous).

Bos, (sp. undetermined: 1 new section in the genus), v. tab. 6, fig. 5, a. b., and fig. 6, a. b.

SOLIPEDA.

Equus Sivalensis, F. & C., v. Tab. 6, fig. a., b., c.

CARNIVORA.

Felis, (number, and character of species, undetermined).

Cats.

Canis, (species undetermined).
Bears.
Hyæna, (species undetermined).
Amyxodon, F. & C.
—— sivalensis, F. & C.

Indications of other Genera.

RODENTIA.

Hystrix, one, (sp. undetermined).
Mus, (species undetermined).
Castor.
Lutra.

REPTILIA.

Ghurial, (Gavial of Naturalists), or Leptorhynchus gangeticus.

Crocodile, (Muggur of Natives), or Crocodilus biporcatus, v. tab. 3, fig. 7 to 9. The head of a very large Crocodile.

Emys, (several species undetermined).
Trionyx, (several species undetermined).
Megalochelys, F. & C.
—— sivalensis, F. & C.

PISCES.

Heads, vertebræ, and scales, &c. of unknown genera and species.

Teeth of Squalus, v. tab. 3, fig. 4 & 5. Tongue of Raya? v. tab. 3, fig. 6, being the only appearance of marine remains.

TESTACEA.

Univalves and Bivalves, chiefly undetermined, but apparently—Unio, Cyclas, Cyrene, Paludina, Planorbis, Helix.

For detailed descriptions of these Fossils by the above gentlemen, see Asiatic Researches, Calcutta, 1836, Vol. xix., Part I., and Journal of the Asiatic Society of Bengal, No. 35, Vol. iii., p. 527; No. 45, 46, 48, Vol. iv., p. 495, 565, 706; No. 49, 53, 55, 57, 58, 59, 60, Vol. v., p. 38, 291, 294, 486, 579, 661, 739, 768, as quoted by the Editor of the Transactions of the Geological Society, Second Series, Vol. v., p. 278.

The Geological system of the Himalayas is extremely simple in the line of the sections, which are about fifty miles apart, and have been constructed from the Author's specimens and observations, commenc-

ing from the plains in both, extending to Kedarkanta in the one, and to near Shalma in the other. The formations may be treated of under the heads, 1st, of the Stratified, and, 2d, of the Unstratified rocks. The Stratified rocks consist of Clay-slate, with Limestone imbedded in, or alternating with it, and surmounted by a Quartz conglomerate, often called in India Greywacke or Grauwacke. Clay-slate continues for some time, and this is succeeded by Micaceous and other Schists and Gneiss. The Unstratified rocks consist of Trap-rocks and of Granite.

Stratified Rocks.—The Himalayas, between the Ganges and Sutlej rivers, like the Sewaliks, present towards the plains abruptly steep fronts, and a comparatively gradual slope in the opposite direction, from the strata dipping towards the north-east. As this is frequently repeated, we have a succession of steep ascents and sloping sides, with a deep valley intervening between two successive ridges, in which usually runs a small river, flowing either towards the Ganges or into the Jumna, or their feeders, or into those of the Sutlej. The drainage of these great rivers is every where separated by transverse ridges, which connect the parallel ridges, having the points of junction often projected into peaks, (*Illustrations,* Int. p. xvii). By proceeding along these ridges, we may penetrate far into the interior, without having occasion to descend into the valleys; but the mountain paths usually take the direct course, and we have thus a succession of ridges and of valleys to cross, and to experience great vicissitudes of climate, as well as a repetition of the geological structure and of the animal and vegetable forms which are dependant on this and on the climate. The plain-ward face being thus abrupt towards the south-west, has the solar rays falling on it more perpendicularly, and therefore experiences greater heat and dryness. The strata dipping towards the north-east, also produce, from their disintegration, a greater accumulation of earth on that side, while the springs following the natural slopes are more frequent on the north-eastern than on the south-western face of these mountains, and therefore the vegetation of the two sides varies much more than would be anticipated by any one who had not observed the difference (v. p. 16).

Clay-Slate.—In ascending the Himalayas, between the Ganges and Jumna, Clay-slate is invariably met with, of great variety of colour as well as of texture, and in many places most remarkably contorted, as at Rikikes, &c. below Surkunda Debee. In the ascent to Mussooree it is soft, variously coloured, and crumbling into small quadrangular pieces. At Mutrogh, below Budraj, near the spring which supplies water to the village, it may be seen of a fine texture, blue colour, nearly perpendicular, and easily splitting into large slabs, is used as roofing

slate. It may be seen of a still finer quality, and in still larger slabs on the ascent to Choor. In many places, nodules of quartz are seen imbedded in clay-slate, and in some places this is found passing into micaceous schist. Copper is found in it, in the neighbourhood of Khalsee.

Limestone.—In the ascent to Mussooree, alternating with the clay-slate, we find Limestone, usually compact and hard, but often honey-combed and cavernous, bluish in colour, passing to grey, whitish and chalk-like in some places, and becoming in others even black. It occurs first at Jureepanee, and then at the top of the range; it is also met with at Sahunsudhara, alternating with clay-slate and dipping east. It is found also in the Suen range, in the Kaphnul valley, as well as in that of the Riknal, and very conspicuously, and of enormous thickness, and over-topping the clay-slate, at Deobund. It is not, however, found constantly alternating with the clay-slate, even in the range which intervenes between the Jumna and Ganges rivers, as it is wanting near Budraj; also between Landour and Surkunda, though very abundant in the neighbourhood of Dhunoultee, one of the places which the Author recommended as an excellent site for a Sanatarium. The Limestone, though in such enormous, apparently amorphous masses, is rather partially diffused, when compared with the Clay-slate. Sometimes it is harder, and even non-effervescent, becoming also siliceous, and like chert; though the pure blue limestone, in connection with clay-slate, is the most common. In some situations it passes into beautiful calc spar, as at Dhunoultee; in others, into white saccharine Limestone, formed of large crystals, as in some places in mica slate and gneiss, as well near the granite of the Choor Mountain, and of Gungotri. Gypsum is found associated with the Limestone in some situations, as at Sahunsudhara, below Mussooree, and at Jureepanee, v. Herbert and Cautley (As. Res.) Heavy Spar, or Sulphate of Barytes, is found in the ascent to Landour, of which, as well as of the rocks, specimens were sent by the Author to the Asiatic Society in 1828. The sulphurous spring in the vicinity of Sahunsudhara, with the dripping rocks and numerous stalactites hanging down from the roof of the cavernous limestone, with the leaves, &c. encrusted with carbonate of lime, have often attracted the attention of, and been described by travellers.

Quartzose Conglomerate.—The Clay-slate formation is, in many of the peaks, surmounted by strata of a rock which Mr. De la Beche has denominated Quartz conglomerate. It varies much in appearance, being light grey coloured on Landour, coarse-grained and reddish on

Budraj, formed of rounded grains of quartz, and therefore usually called sandstone. This varies in appearance, but is usually found at the summits of the peaks, as on Budraj, Landour, and Surkunda, and even on Deobun, in thin isolated strata above the limestone. In other situations, it alternates with the clay-slate, and then, as described by Mr. Everest, "it becomes a distinct greywacke, consisting of a greyish green base, with numerous angular fragments of clay-slate imbedded. No such appearances could be observed in the slates which alternate with the Mussooree limestone; and this circumstance, coupled with that of super-position, seems to mark the quartz sandstone as the newest formation of the two."

Section No. 2.—The clay-slate met with in the interior is usually more uniform in appearance, especially in the line of the section, as on Tuen, where, however, it is much waved and crossed by veins of quartz, so on Acharanda and Jountgurh, and on to Bhok tibba. In the Khulan valley, clay-slate is alone found, and a precipitous slip shows the whole to be of uniform structure. At the head of the valley limestone is met with in masses; the dip is very generally to the N. E.

Micaceous and other Schists.—Mica slate occurs in ascending the south-western face of the Bhok tibba, though clay-slate forms the mass of the mountain, and is immediately succeeded by the mica slate and gneiss series. The clay-slate sometimes passes insensibly into what has been called quartz rock and even grauwacke in India, and in others into mica slate, which is, in some instances, fine grained and dark coloured, so as hardly to be distinguished from clay-slate. Mr. Everest, in proceeding from Mussooree, along the Ganges to its sources, mentions that quartz sandstone soon became the predominant rock, and that the slate had nearly disappeared, being only found in the lowest ground, opposite Ballahaut. The line of junction of the two was seen only a few feet above the level of the river. Somewhat before this, the slate had partly assumed the appearance of talc-slate, having a faint glimmering lustre and a soapy feel. Beyond Ballahaut, he continued travelling near the line of junction of the two formations, the slate gradually passing into a perfect talc-slate, and the quartzy sandstone becoming rather more crystalline than before. Perhaps the name of quartz-rock might be more appropriate to it, though it still exhibited, in some places, traces of round grains agglutinated together. About Batwaree, the quartz sandstone ceases on the low ground, and the slate contains a mixture of quartz and felspar, forming a talcose gneiss, with hornblende occasionally intermixed. Traces of the quartzy sandstone

yet remain upon the cliffs above, for some miles farther to the north, where a gradual passage of it may be observed into the talcose gneiss.—J. A. S., Dec. 1835, p. 692.

In the upper Section, No. 1, after the sandstones of the Nahun and Jytuk ranges, red marl, with veins of carbonate of lime, is seen in descending to the Julal river; and this is succeeded by the limestone and clay-slate series. About Booraree, mica slate, with crystals of hornblende, is met with, and iron pyrites in the valleys on both sides; mica slate succeeds, occasionally fine textured, and scarcely to be distinguished from clay-slate: in ascending to Phagonee, it becomes coarse-grained, and in some places abounds in garnets. Near Phagonee, a large vein of iron is seen, and some coarse-grained crystalline limestone; after which we pass to gneiss, before reaching the projecting masses of granite which form the summit of the Choor Mountain. Above Chowrass, a granite vein, running east and west, is seen crossing the mica slate. In descending, on the N. E. gneiss and mica slate, with garnets, are again seen. Near Chepal, iron ore occurs, and the slate becomes talcose in the bed of the rivulet, and a coarse plumbago slate is seen near the Soonth. The same formations are repeated in proceeding towards Changshill and Kedarkanta. In ascending to Bumpta, the slate becomes very quartzose, with layers of mica, occasionally assuming a granitic structure. On Urukta, mica slate, with garnets, is found, and often with nodules of quartz. In the descent by Deyra, the slate is met with containing grains of magnetic iron, in sufficient quantity to be profitably worked, and which has been named Hornblende Slate by Mr. De la Beche (Manual, 3d Ed., p. 435): it is associated with gneiss and mica slate.

Gneiss.—The system of slates is succeeded in the section by a more uniform formation of gneiss. The extent of which will vary according to our view of what is gneiss. Capt. Herbert calculated the gneiss to be of great breadth, forming a band of which the lowest point is 2,800, and the highest 25,709 feet high, thus including the lofty peaks and the snowy range; as he says: " The highest peaks are everywhere composed of gneiss, the strata of which may be clearly distinguished, when bare of snow, through a telescope. Granite has no where been found except in veins, and these veins are generally small, with one exception—Whangtoo on the Sutlej." In this Capt. H. was incorrect, according to the testimony both of Dr. Falconer and of the Rev. Mr. Everest (v. infra). " The gneiss is of very various character, as far as colour and grain are concerned, though always very regular,

consisting of the usual ingredients, united in the usual proportions; garnets, schorl, kyanite, carbonate of lime, green quartz, and hyacinth, are the most ordinary imbedded minerals. A speck of native gold has been found in a specimen from one of the granite veins."—*Gleanings of Science*, v. 3, p. 268.

Gneiss is found in many of the Passes, associated with chlorite and hornblende schists, as well as quartz rock, sometimes passing into micaceous schist; it is often found in the vicinity of granite, but is soon succeeded by micaceous schist, and this sometimes becoming talcose. The strata in general dip to the N.E., but great irregularities exist, and many instances are seen of their dipping in an opposite direction, but only to a limited extent.

Unstratified Rocks.—Trap-rocks, though frequently met with in fragments, were not until lately, recognized as forming a remarkable feature in the structure of the Himalayas. They were noticed by Capt. Herbert, and compared by him to Greenstone, as the schist in the descent to Khalsee, which he calls a Protean green slate, passing into a rock like greenstone. He also observes, that a trap-like rock is found in the vicinity of Bheemtal, and mentions a "Toadstone, of which the original mass is doubtless to be detected." But a vein of greenstone was discovered by Dr. Falconer in the neighbourhood of Mussooree, and the presence of trap-rocks has since been detected in numerous situations. Previous to this, the elevatory force was supposed to depend upon granite, which is revealed at the surface in so many places in Kemaon, and was supposed to be concealed under the surface to the westward of the Ganges, and raised to a great elevation only at the Choor Mountain. Hot springs abound in the Himalayas, and evidences of recent volcanic action were observed by Mr. Vigne in Cashmere, and have been seen by Dr. Falconer.

The igneous rocks, Dr. F. says, which have been found in the outer tracts, are of the green trap series, and are very generally met with in dykes, intersecting and rising through the regular strata, which are in all directions fractured or comminuted, and the limestone broken up into masses. The Mussooree vein is composed in some places principally of compact white felspar and pyroxene, and in others chiefly of hornblende, and may be traced for half-a-mile in a direction nearly parallel to the range of the mountains. Trap is also met with in one of the ascents to Mussooree, in the bed of the Jumna, and in the neighbourhood of Khalsee, and therefore abundantly displayed even within a limited extent. Mr. Everest mentions having crossed three different masses of greenstone in his journey from Mussooree to Gungotri: first,

on the ridge before descending into the valley of the Ganges, and two others in the clay-slate and talc-slate. He could not in either case trace their connection with the surrounding rocks, but infers that it probably crossed them nearly at a right angle, and if so, their range must approach to a parallel with that of the granite.

Granite.—From the foregoing extract from Capt. Herbert, the comparative absence of granite in the Himalayas might be inferred, though in the line of section a magnificent outburst is observed on the summit of the Choor Mountain, which is greyish coloured, coarse-grained, with veins of quartz, and is porphyritic towards Roundee. Enormous boulders of it may be seen in the valleys, both to the north and south. It was suspected to occur in other places, as boulders and hand specimens were well known and totally different in character from the Choor granite. Capt. H. was well acquainted with its existence in many places, as he says: " Granite displays itself on the southern face in several places, as at Champawut, Dhie, Almorah, Shaee Debee, Dooarahath, Pale dhore, Kunyoor, and Choor, situated, except the latter, in beds in a zone of minimum elevation, and a line passing through them all, has a direction to N. 60° W., the same as that of the strata and mountain range. West of the Ganges no such beds are found, but the granite occupies the summit of Choor; and this is the highest of the mountains of the southern slope of the Himalayas, excepting only those which form the snowy peaks and passes." In colouring these on the large map of the Himalayas they form a line beautifully parallel to the direction both of the Sandstone and the Himalaya range. On the higher belt and northern face, according to Capt. Herbert, and towards the central and highest parts, Granite veins are frequent, as at Whangtoo or Huttoo; and it is mentioned by himself, in his section of the Gonass Pass. But, notwithstanding this, he seems not to have recognized it at the sources of the Ganges, as Dr. Falconer writes me that " the section about the formation of Gungotri, instead of being of gneiss, is all, to the northward of Sookhee, purely granite, and most palpably so, a binary compound of felspar and quartz, with crystals of tourmaline. It is the grand granitic axis of the Himalaya, and one of the greatest and most magnificent outbursts of granite in the world." He went across the direction of it for many miles up the Bhaghiretty, beyond the temple at Gungotri, and saw no end of it. The granite escarpments shooting up into the highest peaks, and the huge cairns of granitic blocks, many of them as large as a house, he describes as inconceivably grand.

The Mines and Mineral productions of the Himalayas have been de-

tailed by the late Capt. Herbert, Superintendent of the Mineralogical Survey of the Himalayas, in a Paper in the Asiatic Researches, Trans. of the Physical Class, 1829, Part I., p. 227, and may be enumerated as Sulphur, Sulphate of Iron, Alum, Bitumen, Graphite, Gypsum, Limestone, Dolomite, Potstone, or indurated Talc. To these Calc Spar and Heavy Spar may be added.

Gold, in many of the streams, and specks of it in the Granite, near Kedarnath.

Copper, Grey Copper, and Copper Pyrites, and Green Carbonate.

Iron.—Red Oxide, Red Hæmatite, Micaceous, Scaly, and Specular Iron Ore, Compact Red Iron Ore, Magnetic Iron Ore.

Lead in form of fine granular Galena. Of the value of the mines we may expect a fuller account from the investigations of Captain Drummond, accompanied by his Cornish miner.

Kunawur and the northern face of the Himalayas. The Geology of this tract is little known, but we may expect a detailed account from the results of Mons. Jacquemont's investigations. Capt. Herbert, Gl. iii., p. 269, has briefly indicated its characteristics.

The Gneiss zone being stratified, and dipping at no great inclination to the N. E., the consequences to be expected are, that in proceeding to the north-eastward, the same succession of strata would be found, but at greater elevations. And this is the fact: although the development of rocks to the north is not equal in extent to those on the south side. Micaceous schist, with its associates, gradually gives way to grauwacke slate or grauwacke, which rocks are found at considerable elevations. Limestone, with organic remains, is found in beds in these rocks, and at such an elevation that the tertiary strata may be expected to occur at very great heights, and even the superficial deposits which have been called *diluvium*.

From the physical features of the country, the existence of tertiary strata might be *expected*, but these have been proved to exist by the Fossils, including the skull and lower jaw of a hollow-horned Ruminant (Antilope), that referred to by Capt. Herbert, Gl. iii., p. 270, with the tooth of a Rhinoceros. Those of the Horse, and Ox are also mentioned as having been found. The locality of these is not known, but Capt. H. concludes that they are from the northern face of the ridge which separates the basin of the Ganges from that of the Sutlej, and not far from the town of Dumpa.

The Fossils described by Dr. Gerard, Gleanings iii., p. 92, as found by him in a loose stratum of black schist, elevated 13,000 to 15,000 feet upon the declivity of the Spiti. The Terebratulæ were particularly remarked on the Laitche Lang Chain, the third great ridge of the Himalayas, at an elevation of 17,000 feet, altogether distinct from the above formation. From the examination of the shells, the Rev. Mr. Everest concluded that there exist in the Himalayan range strata analogous to the early secondary and transition formations of Europe; Gl. iii., p. 30. Specimens of the shells having been sent to Mr. J. D. C. Sowerby, he coincides in this view, and considers some of them as identical with shells of the mountain Limestone, Inferior Oolite, and Lias of England. J. A. S. 1., p. 248. The species in my collection, obtained chiefly from Dr. Gerard, consist of Astarte, a genus of which it is extremely difficult to determine the species. *Arca* or *Cucullæa*, Avicula, Terebratula or Atrypa, with a species not figured; a genus not determinable in my specimens: Delthyris? ; Ammonites, two species. The markings of both indicate that they belong to that division of the genus which range, from the Lias to the Chalk, both inclusive. Belemnites two species.

A section having been given of a portion of the Central Range of India, that is, from Sheerghatty to Rogonautpore, some details might be given respecting their Geological structure, but as the Author has already exhausted his space, he can only refer to the valuable papers of Dr. Voysey and of Colonel Sykes, as well as to that of Dr. Malcolmson, for the Geology of Central India, and to the Geological observations made by the Rev. Mr. Everest, on a journey from Calcutta to Ghazipore. Gleanings, iii., p. 129. The rocky basis of the range is composed of Gneiss, passing occasionally into mica slate; and that this alternates with hornblende rock, which is most conspicuous at the several Ghauts; and that they have both an anticlinal dip from the Granite and Trap, which make their appearance at the Suspension Bridge, and in the Bulbul rivulet. The Granite is also seen in outliers, and on both flanks of the range. On the Gneiss, a gray micaceous sandstone is horizontally deposited, but much disturbed in some situations. With the shale, &c. impressions of fossil vegetables are found, as well as Coal.

The Chinnakooree Coal formation, resembles that of Ranigunj, on the Damooda, described by Mr. Jones and the Reverend Mr. Everest, and noticed by Mr. De la Beche in his Manual, p. 399, from the Author's notes, but which he is compelled to suppress. Gneiss was seen near Pachette, but the hill over which the Author

passed was found to be composed of Red Sandstone and Conglomerate. The Coal is imbedded in shale, with loose-grained gray Sandstone, both above and below. See the above Authors, as well as Mr. Mc'Clelland's able report of " A Committee for investigating the Coal and Mineral Resources of India"* (Calcutta 1838), where the discovery of a raised beach of tertiary shells in the Kasya Hills is noticed, and a list is given of all the sites of Coal (and Lignite, as those in the Himalayas,) at present known to exist on the continent of India. They may briefly be enumerated as follows,—BURDWAN, Ranigunj, Chinakooree, Adjai Seedpoorie, Paribarpoor, Darbadanaghat, Benares Road 149th mile stone, and other places; Hazareebagh, RAJMAHAL, Patsandeh Baghelpoor, Skrigully, Hurra, PALAMOO, two principal beds, Amarath. BIDJEGURH. NERBUDDA, Towar river, Hoshungabad, Jubulpoor, Sohagpore, Chanda, Warda nala. CUTTACK, Mahanadi. ASSAM Deuphapanee near Bramakoond, Namroop river, Suffry or Disung river, near Rungpore, Dhunsiree river, Jumoona river, Kossila river near Gowahate, Chilmari and Doorgapoor. SILHET, Laour and other sites, Kasya hills Chirrapunjie, Sarrarim, Manipur near capital, Gendah on Kuenduan river. ARRACAN Sandoway District, Kyook Phyoo Island. MOULMEIN, Anthracite at Bothoung. SOUTHERN INDIA, Travancore, fossil seeds carbonized. HIMALAYA, Kemaon lignite, Moradabad, lower range. INDUS, Cutch, Peshawur. To these may be added the indications of Coal discovered in boring to a depth of 400 at Calcutta and 300 feet at Goga in Gujerat.†

The Shales of Ranigunj and Chinnakooree contain abundant remains of Ranigunj Reed; *Vertebraria indica*, nob., and of another species, *V. radiata*, nob., *Trizygia speciosa* referred formerly to Sphenophyllum? De la Beche, Manual, p. 400, and mentioned by Mr. Jones as " impressions of flowers." This appears to belong to the natural family of *Marsileaceæ*, v. p. 431.‡ Of this new genus there is a second species found in Germany, and the Author has a third species lent him by Dr. Mantell, from the Anthracite of Mount Carbon, in Pennsylvania. *Pustularia Calderiana*, nob., *Pecopteris Lindleyana*, and *Glossopteris danæoides*, are the other plants obtained from the same locality. *Glossopteris angustifolia*, and *G. Browniana*, are other species mentioned by M. Adolphe Brongniart. The presence of the latter is re-

* Madras Journal, No. 20, p. 153.

† For an account of what has since been done in the search for this mineral, see a subsequent portion of this number.—ED. MADRAS JOURNAL.

‡ Illustrations.

markable, as it was originally found in the carboniferous series of Eastern Australia by Dr. Robert Brown, v. De la Beche, Manual, p. 401.

It would have been interesting to have concluded this cursory view of the Geology of parts of India with a notice of the various mineral resources of that country, which though little developed are very abundant, and some of which have long been known to, and formed articles of commerce to both the ancient and modern civilized nations of the earth, as the Author has endeavoured to prove, from p. 40 to 47, and p. 95 to p. 104, in his "Essay on the Antiquity of Hindoo Medicine, London, 1838."

XII.—*The Meteorology of the Plains and Mountains of N. W. India.*

(From Royle's *Illustrations of the Botany, &c. of the Himalayan Mountains, Supplementary Part).*

Though the Meteorology of a country is frequently omitted in Works treating of Natural History, there is no subject which is more interesting or more closely connected with its several branches, especially when it is desired to point out the connection between climate and the vegetable and animal forms which it supports. This is still more important, indeed essentially necessary, when we desire to make any Practical application to the Arts of Culture of the results of our investigations into the Natural History of a country.

India being so extended in territory and varied in surface, with lengthened coasts, washed by a tropical ocean, and the summits of its mountains, covered by eternal snows, necessarily presents every variety of climate. As it is intended in the present Work to notice the vegetation of its heated plains and valleys, and to compare this with that found on the slope of its mountains, it is desirable, therefore, for the sake of comparison, to notice the more striking characteristics of the climate of different parts of India. This can only be done very briefly; but the Author hopes to be able to return to the subject, and give the details of his observations made at Saharunpore, from the year 1826 to 1830, with the Barometer, and both the Dry and Wet Bulb Thermometer, with observations on Radiation, Temperature of Wells, Quantity of Rain, together with Horary Observations, with all the instruments, from 1 a. m. to midnight, or for one day (the 15th) in each month for one year; occasionally also at different elevations, and at the different seasons of the year, in the Himalayan Mountains.

The instruments were compared with those of Captain Herbert and of Mons. Jacquemont, when these gentlemen passed through Saharunpore, and subsequently with those of my friend Mr. James Prinsep, on my arrival in Calcutta, and the differences between all were very slight.

As much of the vegetation of India is of a tropical nature, and as this is found extending into higher latitudes, or to considerable elevations, when local circumstances favour the production of a similar climate, we may therefore notice the characteristics of tropical climate, which consist in great uniformity of temperature, as well as of moisture, throughout the year. Various attempts have been made to ascertain by calculation the mean temperature of the Equator, assisted by the few observations which we possessed, of places in its vicinity. The illustrious Humboldt was induced to adopt 81° 5′ as the mean temperature of the Equator. Mr. Atkinson, on the contrary, inferred, that it was at least 84° 53′; but when it is considered that five-sixths of this line passes over the Ocean, the mean temperature of which between the limits of 3° N. and 3° S. varies, in general, between 80° 24′ and 82° 4′, and as the air which rests upon these waters is from 1° 8′ to 2° 7′ cooler, it is probable that 81° 5′ is not too low for the mean temperature of the Equator. Sir David Brewster, indeed, from observations since made in Ceylon, Penang, and at Singapore, is inclined to think that this may be too high.

The seasons in equatorial regions are well known to be characterized by great equability of temperature, and, in fact, they are not distinguished, as in high latitudes, into hot and cold, but into wet and dry seasons, and are greatly regulated by the periodical winds. In Java and Sumatra the thermometer seldom rises above 85° or 90° on the coast, falling as low as 70° at sunrise. The heaviest rains take place in December and January, the driest weather occurs in July and August, while the intermediate months afford variable weather. Singapore, from its insular nature, and being 1° 15′ North of the Equator, and near the S. extremity of the Malayan Peninsula, is well suited to give an idea of an Equatorial climate; there we have, fortunately, thermometric observations carried on for six years by Capt. C. E. Davis, three times a-day: at 6 A. M., 6 P. M., and at Noon (v. Journ. As. Soc. 2, p. 428), though the mean temperature deduced from them may probably be a little too high; but in the whole time the Thermometer never rose above 89°, or sunk below 71°, and the mean temperature deduced from the means of the extremes is 80° 04′ in all the years.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum....	84·5	85	87	87	89	88	88	88	88	88	86	86
Minimum....	70·5	73	72	74	75	74	74	75	75	75	74	74
	77·5	79·5	80	80·5	82	81	81. 5	81·5	81·5	81·5	80	80=80·4

This degree of equability is found near the Equator only, but an approach is made to it during the rainy season of the year, both in higher latitudes and at considerable elevations, within the influence of the tropical rains, though the general characteristics of these situations is that of variableness of climate, or of a great range of the thermometer, both daily and annual. The result is the production, not only of great cold, but also of great heat, so that the thermometer is found to rise much higher at, and a little beyond the tropics, than in the neighbourhood of the Equator. This is accounted for, in some measure, by what has been observed by astronomers, that the sun, in his progress from the Equator towards the Tropic, advances in the first month 12°, and in the second 8°, so that at the end of the second month he is 20° from the Equator, and takes a month to advance the remaining 3½°, and an equal time to return, so that during the whole of this period the solar rays must fall nearly perpendicularly at noon on all places between 20° and 23½° of latitude, while a place situated under the Equator has the sun only during six days, as near the zenith, as the above places near the tropics have it for near two months; and, therefore, we may expect a greater degree of heat, which is moreover increased by the greater length of the days. The larger proportion of land near and beyond the tropic of Cancer, as well as the sandy barren nature of the soil, perhaps originally a consequence of, but now acting as a cause, in increasing the heat, together with the dryness of the air, all contribute, as causes, in increasing the absorption of, and the subsequent radiation of the heat imparted by, the nearly perpendicular solar rays. Thus Ritchie and Lyon state, that during whole months the thermometer stood at 117°, and at 128° in the Oasis of Mourzouk; Dr. Coulter mentions having observed it at 140° on the banks of the Rio Colorado, 32° 30′ N. lat., and we have it often stated as being 120°. Mr. Everest gives 111° as the highest at Ghazeepore; Mr. Prinsep as its being 114° at Benares. I have observed it at 107° at Saharunpore. The free radiation of the same open plains in the clear still nights of the winter months, causes a degree of cold which one is surprised to hear of as occurring in situations where the summer heat is so intense; hence the coldness experienced in some of the deserts of Africa, also by Lieut. Burnes, as well as in the plains of India.

The climate of many places in low latitudes has been ascertained, but of these we can only state the mean temperatures: as of places in Ceylon, from lat. 6° to 8½°; of Point de Galle, 81° 10′; of Colombo, 80° 75′; and of Trincomalee, 80° 56′; while the temperature of Madras, in lat. 13° 5′, has been ascertained, by numerous observations, to be 80° 42′. Pondicherry, on the dry and hot part of the Coromandel Coast, and in N. lat. 11° 55′, has the highest observed mean temperature, this having been found to be 85° 28′. Seringapatam, in lat. 12° 45′ N. long. 76° 51′ E., and elevated about 2,412 feet above the level of the sea, has a mean temperature of 77° 06′; the mean at sunrise is 63° 17′; at 3 P. M., 90° 95′; of the day, 84°; of the night, 70° 11′; the highest temperature observed was 115°, and the lowest 48°. At Bangalore, the mean temperature is about 74° 39′.

My friend Mr. James Prinsep, whose lamented illness all friends of science and of literature equally deplore, published, in the year 1832, the results of my observations, and as he has united them with others, I give his tables for the sake of comparison.

"The whole presents a convenient epitome of meteorological phenomena between 12° and 30° of north latitude. Of the climate of Madras, the minutest details are recorded in the voluminous and careful reports of the late astronomer, Mr. Goldingham, whose results merely required to be reduced to the freezing point. The Ava tables are abstracted from Major Burney's Registers, published in the 'Gleanings;' the Benares tables are taken from the Oriental Magazine, 1820; for the Saharunpore results we are indebted to Dr. Royle, who allowed us to look through his copious registers for the purpose. As the several barometers were never absolutely compared together, entire dependence cannot be placed upon the mean altitudes given; but with regard to Calcutta, Benares, and Saharunpore, as some opportunities occurred of comparison through the instruments of different travellers, the relative altitude of these places can be estimated tolerably well: thus, Saharunpore will be found to be almost exactly one thousand feet above the sea, as was before estimated by Captain Hodgson. Benares, in like manner, may be safely stated, in even numbers, to be three hundred feet above the sea.

MONTHLY DEVIATIONS *of the* BAROMETER *and* THERMOMETER *from their annual mean height at Calcutta; and at several other places, introduced for the sake of comparison.*

MONTH.	BAROMETER AT 32° FAHR.					THERMOMETER.				
	Madras, mean of 21 years from 1796 to 1821.	Ava, 1830.	Calcutta, for three years, 1829-30-31.	Benares, four years' observations, 1822 to 1826	Saharunpore 1826-27.	Madras, mean of 21 years' observations, max. & min.	Ava, 1830, sunrise and 4 P. M.	Calcutta, 3 years' observations, max. & min.	Benares, 4 years' observations, max. &. min.	Saharunpore 1826-27.
	Inch.	Inch.	Inch.	Inch.	Inch.	Deg.	Deg.	Deg.	Deg.	Deg.
January.......	+·146	+·229	+·208	+·273	+·274	—6·5	—13·7	—11·6	—17·0	—21.8
February......	+·131	+·115	+·172	+·175	+·219	—4·5	— 4·9	— 6·0	—11·5	—20.9
March	+·087	+·051	+·095	+·107	+·151	—1·8	— 2·8	+ 1·0	— 1·5	+ 0.1
April...	—·006	—·023	—·030	—·043	+·061	+0·7	+ 7·8	+ 5·1	+ 9·5	+ 6.1
May..........	—·124	—·105	—·152	—·136	—·060	+5·2	+ 5·6	+ 7·5	+13·9	+11.6
June...... ...	—·117	—·156	—·248	—·289	—·217	+7·4	+ 7·1	+ 5·5	+13·1	+17.5
July......... ..	—·103	—·176	—·218	—·308	—·398	+3·9	+ 4·4	+ 4·6	+ 6·9	+12.8
August........	—·088	—·126	—·194	—·203	—·278	+3·0	+ 4·1	+ 3·6	+ 6·4	+10.0
September.....	—·057	—·098	—·115	—·098	—·158	+2·1	+ 4·3	+ 3·7	+ 5·8	+ 9.5
October.......	—·018	—·010	+·020	+·074	—·047	+0·1	+ 2·2	+ 2·5	+ 1·3	+ 0.8
November.....	+·005	+·102	+·161	+·181	+·209	—3·1	— 4·2	— 5·4	— 9·7	—10.8
December	+·124	+·201	+·258	+·279	+·245	—4·9	—10·1	—11·5	—17·6	—13.8
Ann. mean..	29·810	29·573	29·764	29·464	28·766	81.69	78·39	78.13	77·81	73·5
Range.......	·270	·405	·506	·587	.672	13·9	21·5	19·1	31·5	39·3

" It will be remarked, that the range of variation in the weight of the atmosphere increases with the latitude, even up to the foot of the Himalaya Mountains, and that it is accompanied by a corresponding increase in the range of the thermometer.

" We now come to the *diurnal oscillation* of the barometer, for which the same sources have furnished me with materials for framing a comparative table for five localities considerably distant from one another; we could have added Moorshedabad to the list, but that the thermometric series for that place was incomplete. At Saharunpore the horary observations were confined to a single day, the fifteenth of each month; at Madras to three similar days; at Benares, perhaps, the hour of the minimum was not always exactly observed; thus a little irregularity must be expected, but on the whole the results are wonderfully equable.

Diurnal Oscillations *of the* Barometer *and* Thermometer *at Calcutta, with Comparative Observations at other places.*

Month.	Barometer at 32°.					Thermometer.				
	Madras, max. & min. every tenth day for 1823.	Ava, 10 A. M. and 4 P. M.	Calcutta, 9 40 A. M. and 4 0 P. M.	Benares, 9 to 10½ A. M. and 4 to 6 P. M.	Saharunpore, max. and min. of one day in month.	Madras, 4 A. M. and 2 P. M.	Ava, sun-rise and 4 P. M.	Calcutta, sun-rise and 2 50 P. M.	Benares, daily extremes by register thermom.	Saharunpore, extremes of one day in each month.
	Inch.	Inch.	Inch.	Inch.	Inch.	Deg.	Deg.	Deg.	Deg.	Deg.
January..........	·072	·144	·123	·097	·103	11·0	9·4	20·7	17·8	24·5
February.........	·070	·126	·117	·103	·093	10·0	16·8	18·5	19·2	21·0
March............	·076	·107	·125	·121	·146	7·0	20·8	14·0	20·7	26·0
April............	·081	·110	·124	·125	·107	9·0	20·9	14·6	23·2	31·0
May..............	·081	·113	·115	·124	·160	9·0	20·4	13·7	21·9	38·0
June.............	·092	·136	·095	·113	·178	9·0	9·0	7·6	16·1	31·5
July.............	·097	·133	·090	·077	·103	7·0	6·6	6·1	9·0	15·3
August..........	·105	·109	·099	·088	·079	7·0	8·8	5·9	8·3	11·5
September........	·094	·145	·101	·103	·123	6·0	7·8	6·2	10·3	13·0
October..........	·068	·144	·110	·100	·120	8·0	5·0	8·4	18·1	31·5
November........	·071	·127	·107	·107	·147	8·0	6·7	13·4	16·8	29·3
December........	·071	·126	·114	·098	·124	9·0	8·5	17·1	16·3	17·5
Mean tide..	·081	·126	·110	·105	·120	8·5	10·6	12·2	16·6	24·2

" With due allowance for the difference of sensibility in the instruments, the above table shews that the average diurnal tide of the barometer between the Equator and 30° north latitude, exceeds one-tenth of an inch, and that it is progressively greater as the variation of temperature during the day is also greater. With regard to the *nocturnal tide* of the atmosphere, the Calcutta tables afford us no data, for want of an observation at 10 P. M., the hour of the supposed maximum at night; all that is indicated therein is, that the barometer is constantly *lower* at sun-set than at sun-rise. At the Madras Observatory, in 1823, a series of horary observations was made for three days in each month, which seems to establish the fact of a night-tide beyond a doubt to the extent of .04 inch; when, however, the corrections for the temperature of the mercury are applied, this amount is reduced to two-hundredths of an inch, which is one-fifth only of the *diurnal tide.*

" The same result is obtained from a month's horary observations, undertaken by Col. Balfour, at Calcutta, in the year 1784. At Saharunpore, also, the existence of a nocturnal tide is equivocal: the following table exhibits all that we can gather towards the elucidation of the point in India, expressing by minus signs the real tide, or fall of the barometer, from 10 P. M. to 5 A. M., and *vice versâ.*" Mr. Prinsep concludes by saying, " There is still sufficient ambiguity respecting this

second tide, therefore, to render further inquiry necessary, and it would be desirable to employ a barometer for the purpose, which should not require to have any correction applied for the temperature of the mercury; this might be easily effected, by enclosing the barometer tube in an outer tube of the same length, also filled with mercury, upon the surface of which the scale might float."

NOCTURNAL OSCILLATION *of the* BAROMETER *from* 10 P. M. *to* 5 A. M. *reduced to* 32° *Fahr.*

MONTH.	Madras, three days in each month.	Berhampore, from Dr. Russel's tables.	Saharunpore, Dr. Royle's observations.	Vera Cruz, in Mexico, by Fray Juan.
January......	—·004	+·034	—·043	+·018
February.....	—·029	+·026	—·009	+·009
March........	—·026	+·069	—·008	—·002
April.........	—·027	+·008	—·007	+·008
May..........	—·014	+·020	—·020	+·005
June..........	—·026	+·012	+·039	+·003
July...........	—·009	·000	—·005	—·002
August.......	—·028	+·014	—·016	—·007
September...	—·024	+·011	+·011	—·012
October.....	—·033	+·009	—·004	—·021
November...	—·010	+·009	+·024	+·001
December...	—·019	+·027	+·015	—·023
Means...	—·021	+·020	—·001	—·002

Saharunpore, as we have seen, is situated nearly at the head of the great Gangetic valley, in N. lat. 29° 57′, long. 77° 32′ E., one thousand miles north-west of Calcutta, in the Doab, or space included between the Ganges and Jumna rivers, about twenty miles from the former, and nine from the latter, and about thirty miles from the Sewalik or Sub-Himalayan range of Mountains. It is celebrated as the station whence the Trigonometrical Survey of the Himalayas was commenced by Capts. Hodgson and Herbert (Illustrations, Introduction, p. xii.). It was then calculated by Captain, now Colonel Hodgson, to be elevated 1,013 feet above Calcutta. Mr. James Prinsep, from my observations, compared with his own, in Calcutta, calculated that my house, situated in the vicinity of the Botanic Garden, was as near as possible one thousand feet above the sea (Journ. As. Soc., vol. i. p. 29). The characteristics of the climate are mentioned at p. 7, of the Illustrations in connection with the vegetation, which is described as being tropical at one season, and partially European at another, and as having,

in consequence, an equally varied cultivation. To display this connection of climate with vegetation, it is desirable to give the temperature, so as to show the rise and fall of the thermometer; I have therefore thought it advisable to commence with the month of March, when increase of temperature takes place so rapidly. The thermometer was placed on the northern side of the house, but too near, for the extremes to be accurately observed, as, though the heat was probably greater, yet the cold was probably less, from the more confined radiation, as the minimum outside of a tent and not far from the house, was 27°, when the other was 38° 5′.

	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Maxima.......	89	96	105·5	105	95·5	92	91·5	90·5	84	69	64·5	81·5
Minima........	47	62	67·5	73	76	78·5	64·5	57·5	45·5	44	38·5	45
Means........	68	79	86·5	89	86·75	85·25	78	74	64.75	56.5	52·5	63·25

Mean temp. ... 73·58

In connection with the thermometric observations at Saharunpore in the open plains of Upper India, it is interesting to give that of the Deyra Valley, in the same latitude, and about forty-five miles to the east. The observations were made by my late friend, the Hon. F. Shore, while Assistant Commissioner in the Deyra Doon.

	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Maxima......	86	93	98	101	94	90	91	86	70	71	68	73
Minima.......	48	53	64	71	72	72	66	61	44	42	37.57	45
Diff..........	38	40	34	30	22	18	25	25	26	29	30·25	28
Mean.........	67	73	81	86	83	81	78.5	73·5	57	56·5	52·8	59·5=70·65

From the greater number of cloudy days, as well as from the greater moistness of the climate, it is found difficult to ripen some fruits which succeed in the plains, though others, as Bengal Plantain, Guavas, and several varieties of Limes, arrive at greater perfection. The greater degree of moisture must be ascribed to the surrounding mountains, and to the quantity of vegetation with which the uncleared parts of the valley are covered. Like other valleys, it is also more close, as the winds cannot blow so freely as in the open plains. The evenings and nights are, however, pleasant, as a cool breeze generally descends from the mountains, and at some seasons of the year the climate is delightful.

In the ascent of the Himalayas, in the course of the Geological section, Jurreepanee is a mid-way station, where I have occasionally taken observations, and of which the temperature feels cool to those who are ascending, but warm to those descending from, the mountains :

	Ther.	Moist Bulb.	Barom.	Merc.	Spring of water.
April 4, eight A. M.........	64	49.5	24.84	71°	63·5
Oct. 2, half past seven A.M.	62·5				
July 22, eight A M.........	68				65·5
,, four P.M	79				

Mussooree and Landour are on the elevated range which rises immediately above the Deyra Doon, and where a Sanatarium for the recovery of the health of European soldiers has been established, as well as houses built by officers, and where I established a small nursery-garden, which was abolished by Lord William Bentinck, but re-established by Lord Auckland. The range enjoys a delightful climate, presenting as great a degree of equability of temperature from summer to winter, and from day to night, as is desirable. In summer the temperature is low, and all accumulation of heat is prevented by the coolness of the breeze which ascends from the valleys. The transition to the rains, which commence about the 15th of June, makes but little difference in the temperature, and the climate is remarkably equable; and though moist and usually cloudy, it is not otherwise disagreeable or unhealthy. In the month of October, or at the conclusion of the rainy season, and throughout November, the sky is so clear and serene, the air so mild and still, that the climate is perfectly delightful. The approach of the cold is so gradual, and its degree so moderate, as to be well calculated to brace the system, when improved by a previous residence in the hills. The coldest months are December, January, and February; in the last the greatest cold, and sometimes snow-storms, occur; after this, the rise in temperature is very rapid. Though 5,500 and 6,000 feet more elevated, the minimum, however, is very little lower than at Saharunpore.

The Author has already said, "that the cold of winter in these mountains, at least on the Mussooree Range, is not in proportion to the coolness of summer. It may be said, that with a winter temperature of their own latitudes,—that is, of the plains at their base,—they have the summer temperature of European countries; so that, without exaggeration, it might be said :—

Gurmush nu gurm ust,—	Its warmth is not heat,—
Surdush nu surd.	Its coolness is not cold."

The mildness of the night, compared with the coolness of the day, appears to be owing to the descent of strata of the atmosphere, which the heat of the day had caused to ascend. These, in descending to a

lower station, become more condensed, and thus having their capacity for heat diminished, give out a portion of their latent caloric, which necessarily prevents the sinking of the temperature to the degree it otherwise would, in consequence of the cooling effect of radiation from the surface of the soil. Favoured as this process is by the stillness and clearness of the night, its effects would be more perceptible, did not the breadth of the ridge bear but a small proportion to the mass of the air by which it is surrounded. This equability of temperature is observed, not only from day to night, but also from hour to hour, and from summer to winter.

One great anomaly presents itself in consequence of the still calmness of the mornings; for though the nights are pleasant and the mornings cool, yet, from the rapid rise of the sun, and the great power of the solar rays, the heat becomes considerable, and even insupportable in the open air, until a gentle breeze rises, and ascending up the valley, continues through the day, apparently following the course of the sun. The maximum of temperature frequently occurs at ten, or, at all events, the increase after that is so slight as not to be perceptible to the senses. In the plains we know the temperature of the air goes on increasing until 2 or 3 P. M. As the latitude is nearly the same as that of Saharunpore, the power of the solar rays and the quantity of heat communicated in a given time must be nearly the same; but in the plains it is allowed to accumulate: in the hills, on the contrary, the breeze which sets in daily from the plains towards the hills, and which commences about 10 A. M. (the very time after which so little increase takes place in temperature), passes over the top of the range, and prevents the accumulation of any heat. This breeze, though caused by the heat of the sun rarefying the dense air, at the surface of the earth, might be expected to arrive at the mountain top in the hot and parched state in which it rose from the heated plains; but the air as it ascends becomes still less dense, and in proportion to this diminution of density is its capacity for heat increased; so that it absorbs all the caloric which, in the plains, was sensible to the feelings, or was observed by a thermometer, and thus, on arriving at the top of the range, it feels cool and refreshing.* At night, a similar, but more gentle breeze, sets in from the hills towards the plains, and the two may, with the strictest justice, be compared to the land and sea breezes of the Coast and of Equatorial islands.

* These observations were first published by the Author in a Paper read before the Asiatic Society of Calcutta, and extracts published in the Journ. As. Soc., vol. i. p. 97.

As instances of the very gradual rise and fall of the thermometer from hour to hour, as well as of the little diminution of heat during the night, the following observations are subjoined, which were all carefully made in the open air, and on clear sunny days, but in the shade:—

Time.	5.	6.	7.	8.	9.	10.	11.	12.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
April 19	58	—	—	70·5	76·5	77	76	75	76	—	67*	69	—	—	—	—	—	—	—	60
,, 21	59	62	66·5	72	74·5	74·5	73·5	73·5	71·5	71·5	72	71·5	68	65	64	—	—	62·5	†	—
May. 6	53·5	58·5	63	68	75	75	75·5	76	75·5	72	66*	70	69	—	64	—	—	58	—	—
Sept. 29	57	59	60	61	—	69	—	69	—	—	—	66	—	—	64	—	—	60	‡	—

The transition to the rainy season is not accompanied with so great a diminution of temperature as might be expected. In the year 1829, the rains came on on the 15th of June. The mean temperature of the two previous days were 67° and 68°, while that of the twenty-four hours subsequent to the rains was 62°, and that of the whole day of the 16th was 63·5

A thermometer hung up in the sun, and freely exposed to its influence, as well as to that of the air, was usually from 5° to 10° higher; the maximum generally taking place about 12.

Atmospherical pressure is also very equable; but the observations have not all been made with a stationary instrument, nor all at the same place in the hills. At the top of the range, where the houses were first built, the barometer observed in September, October, December, and April, did not differ at these various times more than one-tenth of an inch, or from 23·60 to 23·50. Mr. S. Boulderson has published his observations in another part of the same range, called Caineville, from 15th May to 21st of November: he has 24·158 as the maximum mean of seventeen observations, from 1st to 21st Nov., at 10 A. M., while 23·815 is the minimum of twenty-two observations in June, at 4 P. M., giving a range of ·343 inches.

The daily periodical fluctuation was observed to be as regular in the hills as in the plains. The maximum height to which the barometer rose was always about ten o'clock, and the lowest to which it fell, about 4 P. M.

From the equability of temperature as well as of pressure, we might also expect considerable equability of evaporation; but if it were not for the increased capacity of air for moisture, as well as for caloric, in proportion to its rarefaction, the climate would be a very moist one, as, indeed, is the case in the rainy season. From my observations, however, it appears, that there is always a moderate degree of evaporation

* Cloudy. † 57·55 next morning. ‡ 56 next morning, at day break.

in the Mussooree climate; the greatest difference, or 20°, between the dry and moist Bulb Thermometer, occurred on the 6th May; on the same day, the difference at Saharunpore was 32° 5′. On the 5th April, in the morning, after rain, the difference was 7° 5′, while at Saharunpore, on the 7th, also after rain, the difference was only 3° 5′. Even when enveloped in a cloud on the Mussooree range, I have found 2° difference between the dry and moist thermometers, and on cloudy days the difference varied from 4° to 10°. Also at the conclusion of the rains, that is, on the 29th September, the mean of the differences on the Mussooree was observed to be 7° 7′, while at Saharunpore it was only 6° 7′.

The meteorological phenomena observed in the years 1827 and 1828, have been reduced to a tabular form, which will give a good general idea of the nature of the climate, as they nearly correspond with those observed in subsequent years; but the peculiarity of seasons, their greater dryness or moisture, later accession of the rainy seasons, or the total absence of a snow-storm, in some years, will, of course, here, as elsewhere, modify the temperature of particular months.

Results *of* Meteorological Observations *at* Mussooree.

Month.	Means of all the Observations.	Maximum during each Month.	Minimum during each Month.	Means of Maxima and Minima.	Increase and Decrease of each Month.
	°	°	°	°	°
January........	42·45	51·5	34.5	43	—2·55
February.......	45.42	63	27	45	+2·97
March..........	53·63	69	37	53	+8·21
April..........	59·83	77	41	59	+6·2
May............	66·01	78	41	59	+6·18
June...........	67·12	74	61	67·5	+1·11
July...........	67·35	71	63	67·5	—0·23
August.........	66·43	69	63	66	—0·92
September......	64·04	69·5	57	63·25	—2·39
October........	57·25	66·5	48	57·25	—6·79
November.......	50	57	48	52·5	—7·25
December.......	45	55	29	42	—5·
Mean Temperature of the Year.	57·04			56.5	Mean Temperature of the Year from the Monthly Maxima and Minima.

XIII.—*Report of the Coal Committee.*

In submitting a summary of what has been done since our last Report, we shall commence with the

Tenasserim Provinces.

Coal has been found in the Tenasserim provinces by Dr. Helfer in two situations above the falls of the Great Tenasserim, at a distance of eight and nine days' journey, respectively, from the town of that name, but the quality is inferior, and the situation quite beyond the reach of any mode of conveyance to the coast.

Although the quality is excellent in a third situation in which the mineral has been found by Dr. Helfer, yet its distance from the coast is such as to render it of very doubtful utility on the Bengal side of the peninsula, whatever benefit it may eventually prove on the Gulph of Siam, as it seems to be situated beyond the boundary range of hills. Fortunately a still more recent discovery by a native, places us in possession of what would seem to be a most excellent coal, close to the banks of the Great Tenasserim river, and within twenty-nine miles of the town of Tenasserim.

Two reports have been addressed to the Commissioner of the Tenasserim provinces on the last mentioned coal, one by Lieut. Hutchinson, dated 6th May 1839 ; and the other, of a somewhat later date, by Dr. Helfer. From Lieut. Hutchinson's report, we learn that the position of this coal is 12° 21′ 30″ N. lat., and about 99° 5′ E. long., or, by the course of the river, twenty-nine miles from the town of Tenasserim, and sixty-five from Mergui, although its direct distance from the coast is only twenty-eight miles. The coal is said by Lieut. Hutchinson to form a thick bed, covered by three feet of "*clay slate,*" and from twenty to forty feet of *sand, which is so tenacious* as to require no propping where springs do not exist. In a subsequent correspondence on this subject, the coal is described as within ten feet of the surface, and from all we can learn, we have no doubt it might be worked like crop-coal, and clay ironstone, as described by Mr. Farey, i. e., merely by sinking pits down to the coal and raising it at once, and after undermining on all sides as much as can be done safely by the use of props, the latter may be withdrawn, and the roof allowed to fall in.

This coal burns with a bright flame, and answers admirably for steam purposes. Fifty pounds tried in the still furnace laboratory of the

Honorable Company's Dispensary, afforded four gallons of distilled water, and left a residue of four pounds weight of ashes, cinders, and small coal that fell through the bars of the furnace during combustion.

Its specific gravity is 1·27

Composition,

Water,...................	9
Volatile matter,...........	46
Carbon, ...	40
Ash,......................	5
	100

The distance of this coal in a direct line from the coast being only twenty-eight miles, Lieut. Hutchinson proposed to construct a road, which he supposed would reduce the expense of delivery on the coast considerably. Boats of large draught it is said, may ascend the Tenasserim river at all seasons to Tenasserim town, within twenty-nine miles of the coal, and during the rainy season to the coal itself, so that nothing could be more favourable than the position of this coal for all purposes of local improvement, as well as for steam navigation to the eastward. Forty tons of this coal cost 5½ annas per maund at Mergui, and 8 annas per maund in Calcutta. The Government have called upon Mr. Blundell, the Commissioner of the Tenasserim provinces, to provide 50,000 maunds; and have furnished a working party, consisting of persons accustomed to mining, for the purpose, and have intrusted the superintendence of the necessary operations to Lieut. Hutchinson.

We have been informed by Captain Lloyd, I. N., that about one degree lower down the coast, coal has been found of very good quality on the *Senhea* river, but the Committee have no information on this head, although some progress had been made in raising a quantity, when the work was discontinued in consequence probably of the more favourable position of the coal near Tenasserim. The Senhea coal is situated, Capt. Lloyd thinks, about 11° 22′ N. lat., and 99° 8′ E. long. about forty miles up the river, the navigation of which is doubtful. It is however the most southern point at which coal has been hitherto found on the Malay coast.

A detached fragment of an inferior coal called Anthracite by some, has been found near Maulmain, latitude 16° 30′ N. thus indicating the presence of coal formations between the Tenasserim coal fields, 12° N. latitude, and Arracan 19° N. latitude, and holding out strong inducements to further search being instituted in that quarter.

Arracan..

The more we know of coal, the more are we impressed with the fact, that it never presents false indications of its presence. There is hardly an instance either in India or elsewhere of its appearing at all, that it does not do so under circumstances to render it in the highest degree important to Society; and although at first the quality and extent of the beds in any new district may be for a time doubtful, yet experience teaches us, that where these indications do not improve in proportion to the intelligence and enterprise directed to their complete development, the mineral is not true coal, but a substance, the peculiarity of which is easily detected, as the brown coal of English geologists. The samples of coal we received from different parts of the Arracan coast, were such as to leave no question whatever as to the beds from which they were taken belonging to the true coal formation.

Coal has been found composing a part of Oogadong, a small island opposite to the harbour of Kyak Phyo, in two situations not very far from each other. The sample supplied was much impregnated with pyrites, it was however a caking coal, belonging to the true coal measures. It would be a desirable object to try how far the Oogadong coal might answer for the reduction of Rambree iron ore, which is very abundant. Red Hill being said to be composed entirely of an ore that was formerly worked to some extent by the Burmese, a small quantity of the ore and coal might be sent to Calcutta for trial, and if the result proved satisfactory, trials on a larger scale might be repeated on the spot, where experiments of the kind must always be cheaper and more satisfactory than when made at a distance. Coal has also been found on Paget, or Adam's Island, south of the great island of Rambree. It has also been found in small seams in one of the Bolonga Islands, as well as near the beach at Sandoway; but the necessary information is wanting to enable us to conclude any thing from these indications, beyond the fact of the existence of coal, to a great extent, in the Arracan provinces.

The most promising bed yet found, is one that was brought to the notice of the Commissioner, Captain Bogle, by Lieut. Lumsden, who states that it was found about two years ago by persons employed in coal-finding by Captain Williams. This coal occurs at a place called Hoong, near the head of a river, which descends from a range of hills on the southern extremity of the island, falling into the Sandoway channel. Mr. Lumsden states that large boats may approach to the very spot where the coal is found. On visiting the spot, Mr. Lumsden found " an irregular vein of coal, of about a foot in thickness, mixed

with broken red sandstone, and on working below it, he came to a kind of *clay-slate* and eventually to water." Mr. Lumsden, however, states that he was obliged from fatigue to leave the work to a native, who in a few days brought to him 120 maunds of coal—a larger quantity than we should have supposed a native could procure in so short a time, under circumstances described by Mr. Lumsden. A sample of this coal, consisting of four or five maunds, was brought to Calcutta by Captain Bogle, and tried in the Laboratory of the Honorable Company's Dispensary, and found to burn with a clear bright flame and very little smoke. The following are the results of its analysis :—

Specific gravity, ...	1.28
Inflammable matter, ...	40
Carbon, ...	54
Ferruginous ash, ...	6
	100

It is a free burning coal, giving out a strong heat, and would no doubt be found suitable to steam purposes, as it is quite free from the sulphureous impregnation which rendered the former samples of Arracan coal objectionable.

The want of more satisfactory information than we yet possess regarding Arracan coal is much to be regretted, as there is no part of India in which good coal mines could be attended with more advantage, whether we regard the situation on the coast, or the peculiar circumstances of the province itself. This district is chiefly known to Europeans by the mortality that took place there during the late war. Few are aware that within twenty miles of the town of Arracan, there is a fine elevated chain of mountains, extending parallel to the coast, and affording no doubt as fine a climate as any part of the world, although the coast itself is low, and like many similar tracts in the north of Italy, and south of Europe, unhealthy. Let good coal be once discovered in abundance in this fertile province, and the deadly effect of climate to persons exposed in miserable boats, or damp huts surrounded by swamps, will disappear, and the indolent streams become the track of steamers, perhaps to the very foot of the hills, which might thus become available as places of residence.

Sylhet.

Although the attention of the Coal Committee has been constantly directed to this quarter, the only result accomplished since the last report, that can be said to be new, is the delivery of 10,000 maunds of

Cherra coal at Goalparah, in Assam, at the rate of eight annas per maund,* after the attempt to supply that station during the rainy season with coal at any price from Burdwan had failed.

Three beds of coal, situated near the foot of the hills, have been brought to notice, but we have no information on the subject to enable us to decide whether these are new discoveries, or merely the bed alluded to in our last reports, as having been brought to notice some twenty-five years ago by Messrs. Jones and Stark. Without going into that question, we shall merely state all we know of the three beds now alluded to.

The first and most promising, is that of Byrung Poonjie,† situated near a village of that name, within about two miles of water carriage, and the ground such as to allow of the construction of a hackery road.

We know nothing of the circumstances of the bed, further than is stated by Mr. Landers, a practical gentleman, who has been appointed for the superintendence of coal mines in Sylhet and Assam, and who observes—

" Byrung coal is of a soft quality, intermixed with stones three feet and a half high and varying in its thickness. The vein runs from east to west, and descends with the hill towards the south: to what extent this field may exist, it is impossible at present to say, the want of proper implements" (these have been since provided) " prevented me from ascertaining; a trial ought to be made by running galleries into the strata six or eight fathoms, at once to determine both height and quality, and also if it would admit of any outlay." This coal has been tried, and appears to be likely to answer very well for steam, while it has the additional advantage of yielding excellent coke.

Not far distant from the Byrung bed, there is another at a place called Chiela, or Chaila, which varies from one to three feet in thickness. This however is said to be an inferior coal.

Major Lister, to whom we are indebted for the first and almost the only information we have had regarding the two foregoing coals, states, that Mr. Inglis, of Cuttack, has found a coal bed above Chaila, at a village called Mustuk, above 1,500 or 2,000 feet above the plains, and within such distance of water carriage as to enable a porter to deliver five burdens daily from the pit into boats. Mr. Inglis is of opinion

* This having been done under the direction of the Marine Board, the Committee have documents on the subject.

† Communication has been received from Major Lister since the annexed remarks were written, stating that Mr. Landers has traced the Byrung Poonjie bed for two miles to the westward without finding more on an average than a foot of good coal; hence Major Lister and Mr. Landers conclude the Byrung bed is not workable.

that this coal is quite as good as that of Cherra,* and Major Lister observes that it looks so, though the quality is different, being blacker, with an exceedingly high polish; it burns considerably longer than Cherra coal, and cakes less, but is heavier, and yields more ashes.

The value of these, as well as similar indications alluded to in our last report, is still doubtful, and must remain so until the whole tract along the base of the Kasyah hills be submitted to a geological survey. For the present season, if the Government require coal from this quarter, we agree with Major Lister in thinking it will be necessary to confine our exertions exclusively to the Cherra bed. This, as is well known, is situated on the summit of a mountain, nearly 5,000 feet above the sea, and at such a distance from navigable rivers as to render it a day's work for each cooly to deliver a maund, or about 80 pounds, of coal from the pit into a boat.

The only way of lessening this inconvenience would be by improving the conveyance, by an improvement of the road. Above and below the steepest portion of the descent would admit of bullocks being used. Instead of porters for the steeper or middle portion of the journey, it has been proposed to construct a slide, as suggested by the late Colonel Watson. The improvement of the road between Cherra and the plains would be a work of some public utility, as it would be the means of facilitating ingress and egress to and from the mountain plateau, it would therefore be a very desirable object, independent of the coal. The value of a slide however, would depend entirely on our success in finding as good a coal below, as that which is above—an uncertainty which ought to be at once removed by a perfect geological survey, as already suggested.

Some difference of opinion prevails as to the best way of transmitting Sylhet coal to the great lines of inland navigation on the Ganges; some contending that it would be necessary in the first instance to send them a distance of 300 miles to Calcutta, and from thence back to Surda, and other depôts on the Ganges;—experience is the only way of settling questions of this nature, and measures are now in progress for the delivery of the largest possible quantity—10 or 15,000 maunds of Cherra Poonjie coal—in Calcutta, with the least possible delay, compatible with the fair trial of the experiment. The Kasyahs, on whom the burden of the experiment will literally fall, though a fine athletic race, are little accustomed to labour; Major Lister may therefore have some difficulty at first in reconciling a sufficient number of them to a conti-

* A cargo of it having recently arrived in Calcutta, it is now (4th May, 1840) under trial on a large scale, and promises to turn out very favourably.

nued effort, the object and importance of which, they can so little understand.

It is necessary to take the quality of coal into account before any particular price per maund can be regarded as dear or cheap; it is quite incredible to what degree a slight difference in quality affects the value of coal, for steam vessels. It has been found by means of the only trial instituted between Cherra and other coals now in use, that 9 maunds are equal to 14 of Burdwan coal. Let us suppose (without laying too much stress on a single trial of a few maunds) the proportionate value of the two coals to be ascertained as above; 100 maunds of Cherra would not only as a fuel be equal to 155.5 of Burdwan, but we should also have to debit to the latter the value of 55.5 maunds stowage or tonnage, which might amount to more than the entire value of the coal consumed.

The Cherra Poonjie coal forms the cap of a hill, from which each cooly may help himself to his load almost without the aid of mining, so that the carriage, 4 annas per maund from the pit to the nearest navigable river, though high, may be said to include the expense of winning, or bringing coal to the surface. Could any of the following indications of coal lower down, towards the foot of the mountain, be found to yield good supplies, a portion, or nearly the whole of this large item of expense might be saved, viz. 1. Tipperah hills, in a small river which descends from a hill with a Musulman Doorga called Orpeen, on its summit; 2. Opposite to Jalalgur, in Lowr; 3. Patli river, and several streams descending from the Garrow mountains; 4. Near Susung; 5. On the top of one of the lower ranges at Lowr, and in the rivers of Lowr; 6. In the Dysung and its tributaries; 7. Between Pannalik and Bansekora; 8. Barachara; to which we have now added Byrung Poonjie, Chaila, and Mustuk, (vide para. 13, 14, and 15, of the present report).

The rate of boat-hire from the Sylhet district, along the verge of which the coal formation lies, to Surdah on the Ganges, one of the principal depôts for the supply of steamers, is stated by Mr. H. Inglis to be 21 rupees per 100 maunds. In regard to water conveyance, Sylhet has the advantage of any of the coal districts to the westward, while its proximity to the great rivers of Bengal gives it an advantage over the Assam coal districts; and thus while any mines that might be established in Sylhet would hardly be affected in value by similar establishments in any other part of India, there is hardly a district from Arracan to Palamow the value of whose mines would not seriously be affected by any subsequent discovery of coal in Sylhet. In like manner any collieries that might be established in

Assam, or other remote provinces, would be entirely superseded in the Bengal market by any new discoveries of good beds of coal that might be made in the Sylhet district. It is for this reason that we have laid peculiar stress on the importance of a thorough investigation of the coal measures along the base of the Kasyah and Garrow hills, since upon this, and the manner in which it is conducted, must depend in some measure the prudence of investing capital in more distant coal districts.

Surdah is within a few miles of Bogwangola, one of the greatest marts in Bengal for grains of every kind, goor, oil, ghee, and the chief articles of native consumption. Being situated in the centre of Bengal, near the junction of all the principal rivers, as the Bhaugarutty, the Ganges, and Bramputra, it is naturally the centre of internal commerce, and consequently the greatest mart for boats in Bengal. Surdah, or some situation in that neighbourhood, appears therefore to be the situation at which a General Depôt ought to be formed. We have consulted J. W. Grant, Esq. of the Civil Service, who had been long commercial resident at Maldah, and Major Carter, who has been for a large portion of his life in the Bengal Commissariat, and the experience of both these gentlemen goes to prove that at Bogwangola and Jellinghee, boats for the transmission of coal from Surdah to any part of Bengal or the Upper Provinces may be had to any amount of tonnage likely to be required.

The distance from Cherra Poonjie to Calcutta by water, is about the same as to Surdah; while the latter is one hundred and fifty miles nearer to Rajmehal, and other depôts to the eastward.

Major Carter states that the voyage from Calcutta to Cuttack in an empty boat should not take above 24 days, and returning laden, about the same period, as the stream would be favourable to Dacca, and from thence in the tide way. " Assuming however, two months as the time necessary to complete a voyage, including loading and unloading, it strikes me," says Major Carter, " $2\frac{1}{2}$ annas per maund should nearly cover the carriage, and below I give the grounds of my opinion. A thousand maund boat can be hired at

per Mensem..	30	0	0
" 10 Dandies at 3 Rupees each,............................	30	0	0
" 1 Manji at 4 Rupees,..	4	0	0
	64	0	0
			2
	128	0	0

This boat should carry 800 maunds, which just gives 2 annas 6½ pice per maund, so that at this rate Cherra coal ought to be delivered in Calcutta at 7 annas per maund; Major Carter therefore expresses his surprise that an offer recently made by the Marine Board, of 9 annas for Cherra coal, had not been taken up, and suggests that if boats of 2 or 3000 maunds, such as are used for bringing wood from the Sunderbunds, were employed as far as the rivers would admit, the carriage would be still lower.

The readiness with which boats may be had for any regular trade, may be imagined by the following observation of Major Carter:—"Hundreds of large boats frequent the Sunderbunds, nearly as far as Dacca, in search of cargoes of rice and dhan, the worth very little more in ordinary years than coal, and the latter scarcely one half as valuable; they do not find their cargoes at one place, or belonging to one person, but attend the banks, and purchase in whatever quantities the people bring to the market, often only a few seers, and seldom exceeding a few maunds."

The Commissariat regulations, and general custom of paying boat-hire on a computed distance instead of the time actually employed, might in the first instance militate against the economy of any arrangement for hiring boats, says Major Carter; but if a few boats were purchased or built at Dacca or in the Sunderbunds, and manned by a private individual, the result would prove the correctness of these calculations. A good boat could be built for 500 rupees, and in six trips, at the above rate, would yield 300 rupees, leaving 60 for casual repairs, this would repay itself in less than two years; but a boat is expected to last seven or eight.

Cuttack.

About ten years ago a specimen of coal found in the Cuttack district was sent to the Asiatic Society, probably with some particulars which do not appear to have been noted in the proceedings; the circumstance was however suggested to the Committee by Captain Jenkins, in 1837, and soon after Lieut. Kittoe, then with his regiment at Cuttack, obtained a specimen, together with some particulars which he communicated to the Committee; on which he was requested to visit the spot, when he collected the following particulars. Half a mile from the Fort of *Talcheer** coal seams are exposed along the banks of a small *Nulla* called *Belajooree* (at a spot where workmen employed

* Talcheer is a town on the Bramenee river, 140 miles from the coast.

by Mr. G. Becher, had a few years before extracted some specimens of coal). Mr. Kittoe formed an excavation to the depth of 15 feet, in which he found at a depth of 13 feet a bed of " good glistening coal," 1 foot to 1½ foot thick, reposing beneath ten feet of " *shingle*" and two beds of shale and blue clay, each 1½ foot thick. The latter, as well as a grey rock beneath the coal, both containing fossil plants.

Mr. Kittoe states, that a native contractor offered, in the event of coal being raised at Talcheer, to convey it down the Bramenee river to *Himsuagola*, on the coast, where large sloops may anchor, at four annas per maund; but Mr. Beetson, the contractor for the transport of salt from thence to Calcutta, was of opinion, that two annas per maund at the utmost would be sufficient. From the coast to Calcutta the transport of coal would be the same as that of salt.*

The next coal to which Mr. Kittoe by his guide was conducted, is a few miles higher up the Bramenee, and at a distance of sixteen or eighteen miles from that stream, so that its conveyance would be considerably more expensive. The coal is here exposed for a mile on either side of a nulla called *Sungurra*, a tributary of the Bramenee, averaging in height from five to fifteen feet above the sand. The country is said to be level from the coal to the bank of the Bramenee, so as to afford every facility for the construction of either a road or a canal. Iron ore is found in great abundance throughout both these coal districts, and the ore is smelted to some extent, and by the same process as that which prevails in other parts of India.

Such is the substance of Mr. Kittoe's Report.† The specimens of coal furnished were not of good quality. Three specimens of Talcheer coal examined at the Mint, afforded the following average results :—

Specific gravity, ...	1.3610	
Volatile matter, ...	39	0
Carbon, ...	44	1
Earthy matter, ...	15	10
	100	0

Talcheer and Hingolar may be regarded, we think, without much doubt, as an extensive and valuable coal field. The workable beds will

* At present there are three contracts for the conveyance of salt from Hunsew to Calcutta; the rates are 18 Rs., 17 Rs. 8 annas, and 17 Rs. per 100 maunds.

† Vide Asiatic Journal of 1839, pp. 137—144.

probably be found to be some distance from the surface at the spots visited by Mr. Kittoe, but the district appears to have been subject to so much local disturbance, that more favourable positions for coal mines may be expected, when the country has been properly examined.

Since the above remarks were written, the Committee have received a communication from Mr. Mills, the Commissioner of Cuttack, enclosing a report from Mr. Beetson, whom he deputed on 22d February last, at the instigation of Mr. Smith, the President of the Coal Committee, in order to procure further information on the subject. Mr. Beetson reports, that "the samples laid before the Committee by Lieut. Kittoe, were far inferior to those I have now brought with me. The latter are equal to the best Burdwan; but to satisfy the Committee as to its description and quality, if Government will pay the expenses, which will amount to a mere trifle, I shall be happy to undertake the delivery of one or two hundred maunds in Calcutta by next December." Mr. Mills observes that the specimens, as far as he and other gentlemen at the station are able to judge, are so very good, that he authorized Mr. Beetson to procure 100 maunds for trial in Calcutta. This coal is derived from the second, or more distant coal field visited by Mr. Kittoe. The locality in which the coal occurs is, according to Mr. Beetson, called *Gopal Pushad*, and the nulla by which it is laid bare, *Sangra*, which corresponds with Mr. Kittoe's name *Sungurra*. Mr. Beetson states, that the distance from Gopal Pushad to Talcheergur is from fourteen to sixteen miles, and recommends that the coal be carted by buffaloes (the common draught cattle of the country) to Talcheergur. From Talcheer the coal could then be conveyed in ten or twelve maund boats to Kumalung, six miles below Talcheergur, where it should remain till the setting in of the rains, and from thence it may be conveyed for six months of the year in from 100 to 300 maund boats to Hunsuah on the coast, where it would be available for sea-going steamers at from three to four annas per maund. From Hunsuah, Mr. Beetson would undertake to convey the coal to Calcutta at 18 Rupees per 100 maunds, and indeed he thinks he could supply it to the Calcutta market at six annas per maund, including every expense.

Adji.

Since our last report, little has been elicited regarding the northern boundary of the Burdwan coal field, where the beds advance towards the Adji river. Mr. Erskine in reply to a circular from the Committee, dated October, 1838, recapitulates the different places at which coal has been found. Mammudpore is the most eastern situa-

tion. The pits are here four or five miles from Seedporeghat. The mineral is better to the westward at Parihorpore, about ten or twelve miles above Seedpore. Seedpore is eighteen miles from Cutwa or Culna on the Hooghly, and the river is pretty open during the rains for boats of 400 maunds burden from Maulyghat to Cutwa, a distance of forty miles. The upper portion of the river rises and falls suddenly, so as to render it difficult to manage a larger boat than 200 maunds. Mr. Erskine observes, that considering the difficulty of the Adji navigation, and the scarcity of boats at present, and also the high price that it would be necessary to offer to boatmen to induce them at first to undertake the carriage of coals; he does not think the coal could be delivered at Cutwa under four annas per maund. Should the regularity of the employment induce people to build more boats (as has been the case on the Damooda,) prices might fall to about 3 annas per maund. Adji coals are now used for the Dhoba Sugar Works to the extent of 10 or 15,000 maunds per annum.

Rajmahal.

When our last report was written, coal was known to exist in two situations only in the Rajmahal hills; namely, Sicrigully and Hurrah. In April 1838, Major Forbes was informed by Mr. James Pontet that he had found a bed of coal in the Rajmahal hills, on the banks of a nulla called the Bramenee, sixteen miles distant from the water carriage during the rains, about thirty miles west of Moorshedabad, and nearly in the line of the canal proposed by Major Forbes. A specimen of this coal afforded the following on analysis:—

Specific gravity, ...		1.370
Volatile matter, ...	42 0	
Carbon, ...	44 8	
Earthy matter, ...	13 2	
	100	

A sample consisting of a few maunds furnished by Mr. Pontet sometime before to Mr. Scott, the commander of the Jumna steam vessel, also proved of favourable quality. Mr. Pontet having been desirous of procuring the means of extending his observation, these were provided, and on the 20th June he dispatched ten bags of coal to Calcutta, this also proved favourable; but a subsequent dispatch of 400 maunds consisted of shale and inferior coal. In explanation of this last unfortunate circumstance, Mr. Pontet stated that the necessary aid did not reach him till the rains had set in, when the place being unhealthy,

he was obliged to leave the raising and dispatch of the coal to inexperienced natives.

The following is an extract from Mr. Pontet's letter, in which he describes the operations in which he was engaged—" After the first vein of coal, we came upon a hard black stone, and finding the operation of boring through it so very tedious, I took upon myself to select a spot for a shaft, and procured well-diggers, and stone-cutters, who have been for the last two months at work, at present to all appearance with satisfactory prospects, as one of the stone-cutters who opened a shaft at Burdwan says this mine bears some resemblance to it. I am induced to persevere a few feet more, in hopes of coming to a useful vein. The first twenty-three feet of soil is red and black earth mixed with kunkur, and under that, to a depth of forty feet, are thirteen different *strata*, three of coal, and the rest various kinds of stone.'' Mr. Pontet transmitted to the Committee specimens of all the different beds passed through, which are remarkably characteristic of the true coal measures; and of eleven different beds passed through in the last seventeen feet of the excavation, three were coal of good quality, but too thin for working, and in the shale we observed excellent specimens of *Vertabrea Indica*, one of the few abundant fossils of the Burdwan beds that happens to have received a name.

The excavation was formed on the N. W. side of the Bramenee nulla; but Mr. Pontet states that he traced the coal a mile S. W. of the Bramenee river, from which he concludes that the Burdwan and Rajmahal beds are connected

Soan River.

In a letter from Mr. Ravenshaw, Officiating Commissioner of Patna, to the Government of Bengal, dated 6th January last, that gentleman states that a Cazee had found a bed of coal at a place called Chupree, four miles from the Soan, near its junction with the Koila, and estimated the expense of delivering coal from this bed to Dinapore to be five and a half annas per maund. On this information 300 rupees were advanced to the Cazee to enable him to commence operations; but after extracting 100 maunds, precisely similar to Palamow coal, the bed assumed a slaty character, and the Cazee abandoned his operations. If the Cazee's statement regarding the existence of coal so near the Soan be correct, the circumstances under which it occurs ought to be fully investigated.

Palamow.

Mr. Tytler, an engineer employed under the Controller of Steamers, having been deputed, under the authority of the Marine Board, to Palamow, describes a bed of coal six feet thick, exposed to a great extent on the banks of the Amanath river, where Mr. Homfray a short time before could only find a 3½ feet bed, so interrupted by ravines as to render the field very limited. There is however evidence enough in the reports of Major Sage, and Mr. Tytler, as well as in the information furnished to Mr. Ravenshaw, the Commissioner of Patna, to show that coal is here abundant enough, the only doubt is as to its quality. The samples of Palamow coal that we have seen have been vitiated by the inexperience of the miners with an intermixture of shale, so as to render them unfit for trial. Major Sage, Executive Engineer, Dinapore, states that he had formerly been in the habit of receiving supplies of coal from Palamow, which he considered a good and useful fuel. We have no doubt that a good coal may be procurable in Palamow, but such samples as have been hitherto sent to Calcutta for trial have been inferior, partly no doubt from their having been ill chosen from the numerous beds that seem to occur in that district. Major Sage found the following results from comparative experiments instituted between Palamow and Burdwan coal, from which it would appear that the former has the advantage in point of quality.

	Palamow.	*Burdwan.*
Coke,	46 2	46 2
Volatile matter,	47 0	40 0
Earthy matter,	6 8	13 8
	100 0	100 0

In experiments of this kind on a small scale, every thing depends on the specimens selected for comparison. The Burdwan coal varies in quality in different mines, just as Palamow coal would vary if mines were once fairly established in that district.

The best Burdwan coal we can induce the contractor who supplies the laboratory of the Honorable Company's Dispensary to furnish, affords 25 per cent. of ashes, but the kind used on board steamers is said to be very superior to this, and the Ranygunge variety with which other coals are compared, is the best in Burdwan. Much judgment is therefore necessary in selecting samples for trial from new coal districts, when the object is to compare them with Burdwan coal. Whatever

coal it has been customary to use will always have the advantage of a new coal in such trials, in as much as the form of the furnace, and the manner of keeping up the supply will be such as are suited to the old coal, while the necessary experience is wanting with regard to the most favourable circumstances for burning the new.

If the draught of the furnace be too great for the coal, the fire will burn down too rapidly, and the coal will be wasted in an unnecessary quantity; and if not sufficient, the fire will burn too slowly, and the stoaker perhaps accustomed to throw in fresh fuel at certain intervals will keep the fire choked, so as to require more frequent stoaking than necessary, and (as Colonel Presgrave remarked on the late trial of Palamow coal) every time the door is opened for this purpose, a volume of cold air enters, the effect of which is to lower the steam.

On board the Jumna steamer, 13th March last, three samples of Palamow coal were tried, one furnished to Mr. Ravenshaw by Cazee Mohumdee, mixed however with Chupree coal, and the other two from Mr. Tytler; the first seemed to answer best, though evidently raised without judgment, and mixed with shale. The faults of this compared with the best Burdwan coal were, that it required a much larger quantity to keep up steam, and that it ran into slags or clinkers, which choked the bars of the furnace. This last effect may have been owing to the coal being mixed,* and perhaps would not have taken place had the bars of the furnace been wider apart. Mr. Tytler's sample from Lower Miral appeared to burn very freely, but compared with the best Burdwan coal, twice the quantity was required to keep up steam. On a third sample from Upper Miral being tried, it was found that even with an excessive consumption of the fuel, it could not keep the engine at full work. The value of these experiments will however depend on two circumstances, namely, whether the samples tried were the best that could be chosen, and whether the furnaces of the Jumna are as well suited to the nature of the coal as any that could be constructed.

Mr. Ravenshaw thinks he can procure a contract for the supply of Palamow coal at Dinapore for six annas per maund, it would therefore be of some importance to have the question of its quality fairly set at rest.

* A small quantity of carbonate of lime or soda would have the effect of rendering the earthy parts of coal fusible. We think in another trial of Mr. Ravenshaw's mixed coal we could easily select the pieces which formed slags from the general mass, as they are covered on the surface with an efflorescence of soda. We think they belong to Singra one of the Palamow beds, and the peculiarity is probably very local.

Assam.

A report having been furnished on the subject of the Assam coal beds since the last general reports of the Committee were written,* there is little to say on the subject. Lieut. Brodie, principal assistant to the Commissioner, found coal of good quality about a year ago in a very favourable position on the Disung river, a specimen of which was forwarded to the Committee in July last, and found to afford—

Specific gravity, ...	1.3
Inflammable matter, ...	40
Carbon, ...	55
Earthy matter, ...	5
	100

We believe the Assam Tea Company are already about to open a colliery in this situation, with the intention of keeping a depôt supplied from it at Dikoo Mookh, on the main river.

Mr. Brodie had before found two and a half feet bed of coal about three and a quarter of a mile above the falls of the Jumna. A boat on average would reach the falls from Gowahattee in twenty days, and return in ten. Some years ago coal was raised by Mr. Bruce, under orders of the late Mr. Scott, from beds near the banks of the *Suffry*, a tributary of the Disung; on trial *this proved to be the best coal ever found in India*, but the situation was inconvenient, the Suffry being unnavigable at all seasons, and a small ridge of hills would render the formation of a hackery road difficult. In February 1838, Captain Jenkins found two beds of coal, one of them 100 yards in length, and eight feet in thickness, projecting from the banks of the Disung river about a mile above the village of Boorhath; the other situated in rising ground, about a quarter of a mile from the first, was exposed for 200 yards in length, and numerous small springs of petroleum emerged from beneath it. From these Captain Jenkins' servants collected about five seers of petroleum in a few minutes. The Disung is navigable for six months of the year.

Beds of coal were also observed by Captain Jenkins at Jeypoor, about ten miles east of Boorhath, on the Bora Dihing river, a quantity of which was raised by Captain Hannay and sent to Calcutta, but not approved of. Like all similar experiments on the quality of coal the results proved little, especially as we now understand the Assam Tea

* Published in Journal As. Soc. 1838, pp. 948, 959.

Company have established a colliery in this situation,* in addition to the one already alluded to on the Disung; thus two principal depôts will be supplied on the main river at Debru and Dikoo, from distinct coal districts capable, if necessary, of supplying other depôts along the whole line of the Bramaputra.

An excellent coal was found by Lieut. Bigg and Mr. Griffith on the Numroop river, in Upper Assam, and Mr. Bigg states that immediately opposite the village on the west of the river is another range of hills similar to those in which the coal is found; in these they found eight or ten springs of petroleum.

Nerbudda.

With regard to the Nerbudda coal, the Committee have received no communications since their last reports were laid before Government, but it appears to have been since tried at Bombay, and found to be of very excellent quality.

Specimens of coal were found by Captain Burnes during his mission to Cabul in 1838, in the following districts, viz., 1. Shukurdura, near Kala Bagh, where it occurs in a hill two miles south of the village, and other situations in the neighbourhood; distance from the Indus about 15 miles. 2, near Muckud, locality doubtful. 3, fifteen miles SSE. of Cabul near Moozye, in the vicinity of copper mines. 4, Jamoo, in the Punjab, near the Chenab, where it would be as valuable as if found on the Indus. 5, between Tak on Kaneegoorum, NW. of Dera Imael Khan, 1½ coss East of the small village of Sungarkhyle, in the neighbourhood of the Indus, where the country is said to be poor, and labour cheap. Captain Wade, Political Agent at Lodiana, also found specimens of coal in the Maundi Hills north of the Sutlej: more recently we believe Mr. W. Jameson, whose observations will be of peculiar value in every point of view, has found extensive tracts belonging to the coal formation, approaching as near to the Indus as he had been able at the time he wrote to carry his inquiries.—*Journal of the Asiatic Society of Bengal,* No. xcviii—1840.—pp. 198—214.

(*Signed*) J. M'CLELLAND,

4*th April,* 1840. *Assistant Surgeon,*

Secretary Coal Committee.

* As well another at the place.

XIV.—NOTICES OF BOOKS

1.—*Illustrations of Indian Botany; or, figures illustrative of each of the Natural Orders of Indian Plants, described in the Author's Prodromus Floræ Peninsulæ Indiæ Orientalis.—By* ROBERT WIGHT, M. D., F. L. S., *&c. Surgeon on the Madras Establishment.—Madras, Published by* J. B. PHAROAH, *for the Author:*—Quarto pp. 218. vol. 1st.

2.—*Icones Plantarum Indiæ Orientalis, or Figures of Indian Plants.—By* ROBERT WIGHT, M. D., F. L. S., &c. *Surgeon on the Madras Establishment.—Madras, Published by* J. B. PHAROAH, *for the Author:*—Nos. 1 to 16, vol. 1st.

The first volume of that excellent and highly useful work, the *Illustrations* of Indian Botany, is completed with the 13th number. In the prosecution of his plan the indefatigable and talented author has illustrated sixty-two of the Natural Orders. The descriptive accounts of the botanical relations, economical uses and medicinal properties of the plants, with descriptions of recently discovered and imperfectly known species, are ample, and are of the highest practical value and importance, to the physician, to the agriculturist, and to commercial men, as well as affording, aided by the *Icones*, to the Systematic Botanist all that he desires in illustration of the Flora of the extensive and interesting region of Peninsular India.

The pictorial illustrations of the 1st volume amount to 100 in number; they are lithographs, executed at Madras, in a style highly creditable to the state of the arts in India; and coloured, under the author's eye, by native artists.

The *Icones* may be considered, in the author's language, a *pictorial index* to the *Prodromus Floræ Peninsulæ Indiæ Orientalis.* They are uncoloured outlines of all the species which Dr. WIGHT's own collection enables him to give drawings of, or copies from ROXBURGH's and other expensive and little known works.

These two works, then, it will be seen, are unparalleled in the history of scientific publication for comprehensiveness and utility.

With the 13th number of the *Illustrations* are published a *Dedication* to the Right Honorable JOHN *Lord* ELPHINSTONE, Governor of Madras; a *Preface* and *Introduction;* with an *Index,* &c. to complete the volume. From the *Preface* and *Introduction* we shall borrow largely, as they tend to exemplify the scope and objects of the author's works now under review, as well as to develope the progress and present state of botanical science. From the body of the work it is of

little use to commence extraction, for we should be tempted to go on until we had transferred the whole to our pages. The object of this notice is to do all in our power for the extension of the study of Botany through the assistance of Dr. Wight's admirable publications, of which we confidently anticipate an extended circulation; for we are grieved and astonished to find from the author's preface that it needs a "continuation of support from the public, without which it is impossible his contracted means can bring it to a close, as it has already involved an outlay so much beyond its returns, that, but for the liberal aid of Government, in patronizing it and its fellow, the *Icones*, to the extent of fifty copies each, both must long ago have ceased to exist."

"In the Preface to the Prodromus Floræ Peninsulæ Indiæ Orientalis, will be found a brief historical sketch of the rise, progress and present state of Indian Botany. From that sketch it will be perceived that, until the publication of that volume, every work since the time of Linnæus, with the excepton of DeCandolle's *Systema Vegetabilium* and *Prodromus Systematis*, treating of Indian plants, was arranged according to the Linnæan sexual or artificial system. It has naturally followed that nearly all those who had devoted their leisure to the investigation of Indian plants have adopted that system, and find the study of them according to their natural affinities often exceedingly difficult, if not actually irksome, even though the advantages of the latter over the former method so greatly preponderate as scarcely to admit of any comparison being instituted between the two. Instigated, therefore, partly by a long cherished wish to promote the extension of Botanical pursuits by diffusing a knowledge of species, partly by the desire of lessening to others the difficulties which beset my own path when passing from the one method of study to the other; but principally in the hope of being able to show that, for the attainment of a correct and comprehensive knowledge of the properties and uses of plants, whether as food, medicine, or in the arts, a much more direct and certain method is, through an enlarged and philosopical acquaintance with their natural affinities, than by the most laborious, but empirical search for individual properties, when entered upon without any such guide as the knowledge of affinities supplies to our researches. To elucidate these affinities, and at the same time to furnish the Indian Botanist with the means of identifying species, this work and its companion, the "Figures of Indian Plants," were undertaken, and, even at their present early stage, the author has reason to believe with much advantage towards the accomplishment of this design.

" According to the natural arrangement, all plants, whether of a province, a kingdom, or of the whole world, agreeing in certain ascertained peculiarities of structure, taken not from one set of organs only, but from every part of the plant, commencing with the root and ascending to the perfect seed, are grouped together as one order or family, under a name derived either from a prominent genus of the group or from some striking peculiarity of the order (*Ranunculaceae* from Ranunculus,: *Cruciferae* from their cruciate flowers: *Leguminosae* from the leguminous fruit, &c.). Such groups, if correctly associated according to their affinities, that is organic structure and physiological peculiarities, would, it was presumed, be found to participate in the kind and qualities of secreted products which result from the operations of organic life.

" In this anticipation the philosophical investigator of nature has not been disappointed; for, so constantly does the fact agree with the theory, it is now known, except in rare instances, plants referable to different families will not graft on each other, apparently because the juices elaborated in different families of plants, though growing side by side, in the same soil, are so different in their qualities, that those of the one are unfit to nourish a branch taken from the other: while, on the other hand, two plants of the same natural family, however much the soils in which they respectively grow may differ, can generally be readily grafted on each other. From the same cause, the action, namely, of organization on secretion, we find, in a great many instances, identical properties common to whole families of plants. Acrimony predominates throughout the *Ranunculaceae* and *Cruciferae:* narcotism is the characteristic of *Papaveraceae* and *Solanaceae: Apocyneae* are generally poisonous, and some of the species most virulently so: astringency is common to nearly all the arboreous *Mimoseae* as well as to many of the *Caesalpineae*, it equally predominates in *Terminaliae*, and the whole of the genus *Quercus* is pre-eminently marked by that property. The *Cucurbitaceae*, *Convolvulaceae* and *Euphorbiaceae* are equally distinguished by properties the very reverse, the action of many species of each of these orders being violently drastic. The fruit of *Rosaceae* and seed of *Leguminosae*, on the contrary, are so universally wholesome, that it may be laid down as a general rule, almost without exception, that they may be safely partaken of whenever they are met with.

" These few examples will suffice to show how vastly the study of properties is facilitated by an acquaintance with natural affinities, and will I trust, at the same time serve to remove an objection which I have more than once heard urged against this work, that it did not sufficiently,

treat of Medical Botany. This objection could only be raised by those who did not sufficiently consider that its object was to establish principles on a scientific basis, as being the true way to attain the object sought for. There is no royal road to science, and until the medical man studies the principles of Botany as a science, he need never expect, through an inspection of plates or specimens of medical plants, to become a medical Botanist. But with only an elementary knowledge of Botany, such, for example, as a perfect knowledge of the structure of the flower and fruit, an acquisition not generally of very difficult attainment, the case is widely altered; since any one who had advanced so far in the knowledge of the elements of the science may easily make himself master of the characters of a few species of an order, and then he can generally trace its relations with nearly allied orders, or even recognize some of them from family likeness alone. Having ascertained the order of the plant under examination, the subsequent steps leading to the attainment of a comprehensive knowledge of its name, history and properties, are comparatively easy; and not of it only, but of the whole order. It is true, that to acquire a thorough acquaintance with an order, frequently requires the student to examine and carefully compare several, but every plant so examined facilitates subsequent researches, and lessens the difficulty of the next step, that, namely, of making out the genus. But even without going so far, having once determined the order of a plant, we are in possession of a fund of information; since but little further trouble is required to make ourselves acquainted with all that is yet recorded respecting that order, and to ascertain whether any applications we have learned are still unknown to science. The natural method, in short, gives both precision and extension to any enquiries we may undertake respecting plants, whether considered with reference to organic structure and its modifications, the products of organic life in connection with structure, or the applications of these products to the comforts and conveniences of life; and thereby to the advancement of civilization among men. The difficulties to be surmounted at the outset of the study are no doubt often great; those, namely, of determining the order of a plant when it departs from the normal structure of the order to which it belongs: but even then, a futile search is not unattended with advantage, as the examination puts us in possession of much useful information, which will materially assist our future research, should we be necessitated to turn to the artificial system to find its name.

"Should we, on the contrary, commence our examination with the artificial sexual system, the first step, that of determining the class and

order of a plant, is the easiest; but, that done, it often happens that nothing is learned: for, should the specimen under examination have a stamen or style more or less than the regular number, and nothing is more common among tropical plants, we look in vain in the class or order, where, according to our specimen, it should be found; and, when found, still that system conveys no collateral information regarding the relations of the plant, or of the nature of the properties with which it may be endowed.

"In drawing these comparisons, it is not my wish unduly to exalt the one at the expense of the other, for in truth they are so very different that it is impossible to compare them; they both have their advantages and disadvantages, and, in the present state of the science, are both necessary: I certainly think, however, the preponderance of good is greatly in favour of the natural method. In thus giving the preference to that system which enables the student, who has made considerable progress in its study, to look over a large collection of plants, not one of which he had ever seen before, and readily refer probably as many as 19 out of every 20 to its proper natural order, from family likeness alone, I am far from as yet wishing to see the other altogether exploded, since by it we are often enabled quickly to determine abnormal plants that we could not so easily have done by the other; and, in such cases, I still occasionally find the advantage of having formerly become familiar with the Linnæan system. Though to this extent I approve of it, I could not recommend it for general use, as its natural tendency is to contract our ideas, by concentrating our attention too exclusively on one set of organs, and confining our enquiries to the investigation of the names of species only, in place of, as is the case with the other, expanding them with the growth of our knowledge, by extending our researches, from the examination of species, to the investigation of masses in all their bearings.

"While for these cogent reasons, we are, in the present advanced state of the science, gradually permitting that once celebrated system to drop into oblivion, we must not forget how much Botany is indebted to it for its present advancement. The extent of these obligations can only be justly appreciated by comparing the botanical works of its great author with those of his immediate predecessors, not one of the plants described by whom can now be made out from their descriptions, unaided by some collateral circumstance, or by plates, and too often, even with these aids, they are still unknown. Immediately on its introduction into practice, order supplanted disorder, arrangement and method succeeded and dispersed the previous confusion and perplexity, as light

disperses the darkness. From this hour materials accumulated with unprecedented rapidity, and have continued to do so to such an extent, that the catalogue of known plants which, on the most liberal computation, did not, at Linnæus' death, exceed 12,000, is now but little if at all short of 100,000 species. To this increase the natural method owes much of its present admirable precision, as, without such a mass of materials, innumerable breaks in the chain of affinities must still have existed, marring both its beauty and usefulness. We may thence I think fairly conclude, that the sexual system of Botany, however defective in scientific precision and comprehensiveness of design, was yet of incalculable benefit to the science; the impulse which its beauty and simplicity communicated, calling thousands of enthusiastic votaries into the field, by whose joint labours was collected the vast mass of valuable materials of which the more philosophical natural method was constructed : leaving altogether out of consideration, the justly admired nomenclature and precision of language appropriated to the description of plants introduced by its author—the universally acknowledged father of modern Botany—Linnæus.

"Having I trust satisfactorily shown that the essential difference between the two systems lies in the tendency of the one to contract our ideas, by attaching an undue value to the knowledge of species, while that of the other is to elevate and expand the mind by imparting a knowledge of and leading to the contemplation of masses, I believe I have said all that can be required in support of my preference of the natural system, and of the propriety of my first determination to publish a flora of this portion of India arranged according to that method. The same reasoning equally establishes the propriety of my entering on the present work, explanatory of the principles of that system, and showing its application to the grouping in masses of the knowledge which has for ages been accumulating as detached observations ; but which, until thus concentrated, was of difficult access, and, when obtained, only applicable to the species to which it originally appertained, in place of, as now, by affording so many points of comparison, or known quantities, enabling us to deduce useful applications of hitherto unknown plants, simply on the ground of their structural relationship or affinity in the system of nature to others, the qualities of which are well known.

"That many anomalies, nay positive contradictions, occur in our present groups, is undeniable ; but it is equally certain that many of these are disappearing under the more rigid scrutiny of structural peculiarities, which have often shown, that the most striking departures from the general rule, were attributable, not to imperfections of the rule itself,

but to erroneous associations of plants, either only remotely or not at all allied, in the same groups.

"The objects of this work may now be briefly summed up: they are, first, to explain the principles of grouping plants according to their natural affinities, and illustrating these by figures of species appertaining to each group: and, secondly, to show, by adducing a variety of examples of the fact, that, in a great majority of instances, similarity of structure, or botanical relationship, is accompanied with similarity of properties; and, lastly, to prove that these premises lead to the inference, that, having ascertained by careful examination and comparison its nearest botanical relatives, the properties of which are known, we are often enabled to infer the properties of an imperfectly known plant. In addition to these more immediate objects, I have endeavoured to render it a supplement to our Prodromus, by a running commentary on that work, and by the description of such new species as have come into my possession since its publication. To render the information thus embodied in these pages as easily accessible as possible, I have added a very copious index, including every name and noting every page where it occurs. By this means any one is enabled, with little trouble, to trace a family through all the relations, whether botanical, economical or medical, in which it occurs in these pages."

Introduction.—"It is laid down as an axiom by some eminent modern Botanists, 'that nature only creates species, and knows nothing of a natural system of Botany.' This, it is added, is entirely a human contrivance, founded on a consideration of the resemblances existing between the parts, properties and qualities of plants, according to which their affinities are determined, and species, having the greatest degree of relationship in all these particulars, are placed next each other, in such a way, that the qualities or intimate structure of an imperfectly known plant, may be inferred from a careful consideration of the known qualities and structure of those nearest to which its botanical characters would place it, in a system constructed on these principles. Whether or not this theory be just, I will not stop to enquire, for, so long as the object is obtained, I feel quite satisfied that the method by which we attain it, whether a mere human contrivance or the work of nature herself, is so infinitely superior in its fitness for the supply of human wants, and for furnishing matter for philosophical enquiry, to all the artificial ones that have gone before, that there can be no hesitation as to the propriety of its instant adoption, whatever may be the difficulties to be, in the

first instance, surmounted in acquiring a knowledge of its principles. These, in the present instance, are not by any means so great as they have been represented; for, as Jussieu well observes, whatever trouble is experienced in remembering or applying the characters of natural orders, is more than compensated by the facility of determining genera, the characters of which are simple in proportion as those of orders are difficult. The reverse takes place in arbitrary arrangements, where the distinction of classes and sections are simple and easy to remember, while those of the genera are in proportion numerous and complicated. On this question, therefore, as there can scarcely be two opinions, it now only remains for me very briefly to explain the principles of the arrangement or distribution of the orders, adopted both in this work and in our Prodromus.

" The arrangement followed is very nearly that of Jussieu, as modified by DeCandolle, and adopted in his Systema and Prodromus. According to this system, all plants are first distributed under two principal classes, Cellular and Vascular, the former comprehending all the plants destitute of spiral vessels and of Cotyledons—Cellulares; the latter, including all the flowering plants which are furnished with both these organs—Vasculares. The vascular plants, of which only we have as yet treated, are again divided into two classes—Dicotyledons or Exogenous plants, and Monocotyledons or Endogenous plants. To the former, all trees and shrubs which increase in thickness from the centre towards the circumference by a succession of concentric layers of wood, belong, as well as nearly all those herbaceous annuals, the leaves of which have reticulated or anastomosing vessels. To the latter the various kinds of grasses, Lilies, Orchidiæ, Palms, Plantains, &c. belong; the vessels of the leaves of which pass either in straight lines from the base to the apex, or from the midril to the margin, and the leaves are sheathing, in place of being attached by a joint to the stem. These distinctions are not without exceptions; but the exceptions are so few as scarcely, in practice, to affect the value of the rule. These primary divisions, though thus based on the most obscure and difficult portions of vegetation to investigate, the minute structure of the seed and organization of the stem, are, in fact, the easiest, generally speaking, of determination; the simple circumstance of a plant having a flower, proving that it has spiral vessels, while the practised eye of a botanist can, almost invariably, tell at a glance, by merely inspecting the distribution of the vessels of leaves and structure of the stem, whether the seed is mono: or dicotyledonous. Having, by this summary process, decided to which division of the system a plant belongs, we proceed

with our investigation. Let us suppose the plant is dicotyledonous, and that we still follow DeCandolle as our guide.

" He divides *Dicotyledonous* or *Exogenous* plants into four sub-classes, the characters of which are taken from the fructification. These four are respectively named *Thalamifloræ*, *Calicifloræ*, *Corollifloræ* and *Monochlamydeæ*.

I. " *Thalamifloræ* are distinguished by having several distinct petals and stamens inserted on the Thalamus or receptacle of the flower, and not cohering with the calyx.—(flowers hypogynous).

" The petals and stamens do, however, occasionally cohere; as, for example, in *Malvaceæ*, so as in some degree to resemble those of the third class, *Corolliflorae*, from which, however, in all such cases, their numerous, nearly distinct, carpels distinguish them.

II. " *Calyciflorae* have also several petals, either distinct or united to each other, but inserted along with the stamens on the calyx, usually through the medium of a disk lining its tube or concave portion.—(flowers pyrigynous or epigynous).

III. " *Corollifloræ* have the petals united into one, bearing the stamens, and inserted on the thalamus, or receptacle (hypogynous).

IV. " *Monochlamydeæ* have either no corolla, or the petals, if present, are united to the calyx, forming together a single, not double, perigonium or verticel of flower leaves round the pistil.

Before going further it may be proper to observe, that this is a mere artificial classification, intended simply to facilitate the arrangement of the orders in a linear series, and to aid in enabling us to determine to what part of that series we ought to turn to find the order of any plant under investigation. While it pretty well fulfills these objects, it must be acknowledged, that, like all such artificial combinations, it is liable, on the one hand, to produce unnatural associations; and, on the other, to separate orders most nearly allied; besides presenting examples of monochlamydeous and dichlamydeous genera in the same order. These objections, however, apply to the arrangement, only, of the orders, not to the orders themselves, which may, though individually perfectly natural, be most unnaturally placed in relation to each other; a defect, to which all systems yet proposed are more or less liable, and, we may almost assume, ever will be, when we take into consideration that families of plants, like provinces of a kingdom, touch each other, not by one point only, but on all sides, and that we might as well expect to arrange the latter in a correct, linear series, as the equally irregularly formed and closely surrounded provinces, that is the natural orders, of

the vegetable kingdom. All, therefore, that can be looked for, are well constructed and correctly defined orders or provinces, the boundaries of which should be as clearly marked out as the nature of the subjects will permit. Then comes the arrangement of these, in such a manner as to facilitate reference, or, to follow out the simile of kingdoms and provinces, to teach under what latitude and longitude we must look, first for the province (the natural order), and then for the town (the genus), to which the subject of our enquiry (the species) belongs. Various plans have been tried for the attainment of this desideratum, but no one seems yet to have obtained such general favour as the one the ground work of which I have sketched, even though liable to such striking defects as those I have indicated. But to proceed.

I. " THALAMIFLORÆ.—This sub-class includes all the plants originally referred by Jussieu to his 13th class (Polypetalæ hypogenæ), those, namely, with hypogynous or inferior flowers, and several petals; or which has more recently received the name of Hypopetalæ, that is, petals inferior to the pistil or ovary. This is a large class, presenting many anomalies; but, upon the whole, generally of sufficiently easy application in practice.

II. " CALYCIFLORÆ.—This sub-class is more difficult, and often not easily distinguished from either the preceding or the succeeding one. It is divided into six sections.

1. " *Peripetalæ*, with several distinct petals inserted on the calyx towards its base, leaving the ovary superior or free—*Leguminosæ*, the section *Potentilleæ* of *Rosaceæ*, and *Salicarieæ*, all afford easily understood examples of this section.

2. " *Epipetalæ*.—In this section the tube of the calyx is prolonged and lined by the torus, which forms a small disk on the summit of the ovary, and the ovary is enclosed by and coheres with the calyx tube: the distinct petals and stamens are inserted on the outside of the disk. The ovary is here said to be inferior or adherent, and the flower superior. *Roseæ*, *Pomeæ* and *Combretaceæ*, apparently afford examples of this section, but want the disk on the summit of the ovary. *Umbelliferæ*, *Araliaceæ* and *Corneæ*, are the only orders referred here as being truly epipetalous.

3. " *Epicorallæ Corisantheræ;* this section differs from the last in having the petals united, forming a monopetalous corolla, bearing the stamens inserted on its tube, and the anthers not cohering round the style. The common honey-suckle is a familiar example of this section; to which also the elder, the coffee, valerian, &c., that is the orders *Caprifoliaceæ*, *Rubiaceæ*, *Valerianeæ*, &c. belong.

4. " *Epicorollæ Synantheræ;* the essential distinction between this and the preceding section consists in the anthers of this cohering by their edges, forming a tube round the style; and from the succeeding, by the corolla being inserted on the top of the ovary, not on the bottom or tube of the calyx.

5. " To this section the vast order *Compositœ* alone belongs; as examples of which it may suffice to mention the humble Daisy, the common Thistle, the Artichoke, the Dandelion, and gaudy Dalia, to enable every one to understand what is meant by a compound flower, the general flower of each of these being made up of a congeries of small ones.

6. " *Pericorollae;* in this, as in the two preceding sections, the petals are united into a monopetalous corolla, but in place of being inserted on the top of the ovary, it is inserted on the tube, or towards the base of the calyx; leaving the ovary either partially or altogether free.

" The Lobelia, the Hairbell, and Heath tribes, afford examples of this last section of the 2d class.

III. " Corollifloræ.—This sub-class differs from the three last sections of the preceding, in the insertion of the corolla only: like them the corolla is monopetalous, bearing the stamens; but, in place of being inserted on the calyx (perigynous), springs from the receptacle or base of the flower, inferior to the ovary (hypogynous): hence, in the language of Jussieu, the section is now named *Hypocorollae* (see table below).

" The Jasmines and Convolvulus afford the most familiar examples of this class, but the Gentians, Trumpet flowers (Bignonia), Heliotropes, Verbenas, Solanums (Brinjal, Potatoe, &c.) all belong to it.

IV. " Monochlamydeæ.—This sub-class is characterized by having a single perianth, that is, only one verticel or whorl of floral envelopes, or if two are at any time present, the petals adhere to the calyx. It is divided into four sections.

1. " *Hypostamineae;* here the stamens are inserted on the receptacle, and the ovary is free, even though concealed within the tube of the calyx, to which it does not adhere. The Marvel of Peru *(Mirabilis Jalapa)*, so much prized as a garden ornament, and the Amaranthus, appertain to this section. The flower of the former, often so delicately variegated, is in truth only a petaloid expansion of the calyx, and not a corolla, in the glabose inflated bottom of which, the filaments and ovary are found perfectly free. This lower portion of the calyx afterwards forms the black shell-like covering of the seed.

2. " *Peristamineae;* in this the stamens are inserted on the calyx, not hypogynous. *Chenopodium, Polygonum,* and the beautiful *Begonia,* are examples of this section.

3. " *Epistamineae;* here the ovarium is inferior, cohering with the tube of the calyx; stamens, inserted on the limb, or superior. *Santalum album* (Sandal-wood), and *Aristolochia* (Birthwort or snake-root) are well known examples of this section.

4. " *Diclines;* flowers unisexual or without a perianth. To this tribe are referred *Euphorbiaceæ, Urtiaceæ, Piperaceæ,* besides the Oak, Alder, Birch, Willow, Pine, Walnut, &c. Judging from the dissimilarity of the plants associated under this name, bearing in mind, at the same time, that several other orders in which diclinous flowers predominate are scattered through the system, it is to be hoped future researches will tend to break up this class, and, by the removal of some of the orders, will establish a more natural distribution of the remainder: some of those now placed here seem to have been referred to it, as to a lumber room, from not knowing where to dispose of them to greater advantage.

" For the remaining portion of the system *Monocotyledons* and *Acotyledons,* I shall refer for the present to the subjoined tables: the first exhibiting a *Clavis* of the system of Jussieu, the next, that system as modified by De Candolle, and adopted in our Prodromus.

I.—COTYLEDONS none.

Class 1. *Acotyledones.*

II.—MONOCOTYLEDONES.

2. *Monohypogynæ,* stamens hypogynous.
3. *Monoperigynæ,* stamens perigynous.
4. *Monoepigynæ,* stamens epigynous.

III.—DICOTYLEDONES.

§ 1. Apetalæ.

5. *Epistamineæ,* stamens epigynous.
6. *Peristamineæ,* stamens perigynous.
7. *Hypostamineæ,* stamens hypogynous.

§ 2. Monopetalæ.

8. *Hypocorollæ,* corolla hypogynous.
9. *Pericorollæ,* corolla perigynous.

10. *Epicorollæ synantheræ*, corolla epigynous, anthers united.
11. *Epicorollæ corisantheræ*, corolla epigynous, anthers free.

§ 3. Polypetalæ.

12. *Epipetalæ*, stamens epigynous.
13. *Peripetalæ*, stamens perigynous.
14. *Hypopetalæ*, stamens hypogynous.

§ . Diclines.

15. *Diclines*, flowers unisexual, or without a perianth.

A. DICOTYLEDONES, *Jussieu.*—Exogenæ, *De C.*

I.—THALMIFLORÆ, *De C.*—Cl. 1. Hypopetalæ, *Juss.*

II.—CALYCIFLORÆ, *De C.*

Cl. 2. Peripetalæ, *Juss.*
3. Epipetalæ, *Juss.*
4. Epicorollæ corisantheræ, *Juss.*
5. Epicorollæ synantheræ, *Juss.*
6. Pericorollæ, *Juss.*

III.—COROLLIFLORÆ, *De C.*—Cl. 7. Hypocorollæ, *Juss.*

IV.—MONOCHLAMYDEÆ, *De C.*

Cl. 8. Hypostamineæ, *Juss.*
9. Peristamineæ, *Juss.*
10. Epistamineæ, *Juss.*
11. Diclines, *Juss.* { § 1. Angiospermæ. § 2. Gymnospermæ.

B. MONOCOTYLEDONES, *Juss.*—Endogenæ Phanerogamæ, *De C.*

Cl. 12. Monoepigyneæ, *Juss.*
13. Monoperigynæ, *Juss.*
14. Monohypogynæ, *Juss.*

C. Cl. 15. ACOTYLEDONES, *Juss.*

§ 1. Ductulosæ, *Arn.*—Endogenæ Cryptogamæ, *De C.*
§ 2. Eductulosæ, *Arn.*—Cellulares, *De C.*

"Of this system I have only further to observe, that the three primary divisions, Acotyledons, Monocotyledons, and Dicotyledons, are strictly natural, and must always be retained in every botanical system professing to arrange plants according to their affinities. So much cannot be said for the classes; they rest, with one exception, on a single point of structure, not in itself invariable, in the respective classes; the insertion, namely, of the stamens and petals, whether hypogynous or perigynous, points not always determinable without the aid of analogy. The secondary divisions, according to which the classes are grouped under four sections, are still more artificial and more liable to vary, and thence so much the less to be depended upon. Though to this extent artificial, this method of arranging the almost innumerable forms met with in the vegetable kingdom is, beyond comparison, superior to all that went before it; and though the classes, in which the orders are grouped, be somewhat arbitrary, they are yet so convenient, and generally so easily distinguishable in practice, as to leave little room to doubt that the arrangement, as a whole, owes much of its celebrity, and its recent almost universal adoption, to that very blemish. Various attempts have, however, been made to remove that imperfection from this justly admired system, but, so far as I am able to judge, all only serve to show, that, had Jussieu adopted any such arrangement, in place of his own, in the first instance, there is much reason to believe the sexual system, with all its imperfections, would still have reigned paramount in Botany.

" 'Jussieu originally prefixed no names to his classes, and the want of this was much objected to. Those which we have given have been lately proposed by Antoine L. de Jussieu in the *Dictionnaire des Sciences Naturelles;* and, although not entirely in unison with the principles of the Greek language, may be adopted as extremely useful, each being so framed as to suggest the structure of the class. Thus the commencement *Mono*, indicates the Monocotyledones. *Epistamineæ*, &c. having in no part any allusion to a corolla, suggests its absence. *Hypocorollæ*, and the others, allude to the corolla being of one piece, and not of distinct petals, which last is pointed out by names, *Epipetalae*, &c. The other parts of the names, *epi* (upon), *peri* (around), and *hypo* (under), need no farther explanation.

" 'While engaged in the study of plants alone, it is obviously of little consequence whether we begin, as Jussieu did, by the Acotyledones, or by the Dicotyledones; but, if we view botany as a science that treats of only one of the great kingdoms of nature, and wish to introduce it into a *Systema Naturæ*, we must bring those portions of each

most closely together which are most nearly linked. So that if we commence by Zoology, we must first describe the Mammalia, and end by those of a simple structure; and then take up the most allied of the Acotyledones, and follow the steps of Jussieu. But, if we describe vegetables in the first place, we must begin with the Dicotyledones, and finish with the Acotyledones. When, however, a *Systema vegetabilium* is contemplated without reference to animals, it may perhaps smooth the way to the student if it commence by those more obvious, and, though of more complex formation, yet more simple to be comprehended. On this account DeCandolle has reversed the arrangement of Jussieu.' (Article Botany Encly. Brit. 7th Ed. by Dr. Arnott)."

III.—*Illustrations of the Botany and other Branches of the Natural History of the Himalayan Mountains, and of the Flora of Cashmere.* —*By* J. Forbes Royle, M. D., V. P. R. S., *Late of the Medical Staff of the Bengal Army, &c. &c. &c.*

In former numbers of this Journal we have rendered the deserved meed of praise to previously published parts of this splendid and highly interesting work. It is now concluded, by the publication of the 11th or supplementary number (just received in India); which, besides the termination of the botanical illustrations, forming, of course, the bulk of the work, includes short treatises on the following subjects:—1st. *On the Geology of the Himalayan Mountains,* by Professor Royle; —2d. *On the Meteorology of the Plains* and *Mountains of N. W. India,* by the same;—3d. *On the Entomology of the Himalayas and of India,* by the Rev. F. W. Hope, F. R. S., F. L. S., &c., President of the Entomological Society of London;—4th. *Memoir on the Mammalogy of the Himalayas,* by Wm. Ogilby Esq. M. A. &c. &c., Secretary to the Zoological Society of London;—5th. *List of Birds in Dr.* Royle's *Collection.* The two first of these we have transferred to the pages of our present number, and we are sure we cannot more effectually subserve the cause of Science, than by republishing the whole of these valuable treatises, which will, through the medium of this Journal, penetrate into remote parts of India, where the extremely valuable original work, owing to its bulk and costliness, may never reach.

XV.—*Proceedings of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.*

Thursday Evening, 11*th June* 1840.—*Colonel* W. MONTEITH, K. L. S. *in the Chair.*

The following works, presented to the Society, were laid on the table, and thanks voted to the donors:—

Choix De Contes et Nouvelles traduits du Chinois par Théodore Pavie—By the Translator.

Calcutta Journal of Natural History, No. 1—By the Editor.

The following communication to the Society, was laid before the meeting :—

Continuation of the Catalogue of the birds of Southern India.—By T. C. Jerdon, Esq.—Tribes *Tenuirostres* and *Fissirostres.*

(Published in our present number.)

Thursday Evening, 2*d July* 1840.—A. D. CAMPBELL, ESQ. *President of the Committee of Papers, in the Chair.*

The following works, presented to the Society, were laid on the table, and thanks voted to the donors:—

A Guide to Chemical Testing and Analysis.—By LIEUT. BRADDOCK.

Transactions of the Royal Medico-Botanical Society of London, vol. 1, part 4.—By the Medico-Botanical Society.

Journal of the Royal Geographical Society of London, vol. 9, part 3. —By the Royal Geographical Society.

Journal of the Asiatic Society of Bengal, No. 96, December 1839.— By the Asiatic Society.

Read a letter from the Secretary to the Geological Society of London, dated 7th November 1839—expressing the Society's thanks for the donation of the Madras Society's Journal.

Read a letter from the Secretary to the London Linnean Society, dated 5th November 1839—returning the Society's thanks for Nos. 13 to 22, both inclusive of the Society's Journal.

Read a letter from the Secretary to the British Museum, dated 13th January 1840—acknowledging the receipt of the Society's Journal, Nos. 22 and 23, and returning thanks for the same.

The following communications to the Society were presented:—

A note by Colonel Cullen on the carboniferous deposits on the Malabar Coast.

(Published with Mr. Newbold's Paper in the present No.)

A specimen of Coal from Mergui on the Tenasserim Coast was presented from the same gentleman, with the following account of the locality whence it was derived.

Extract from a letter addressed to Government, on 9th December 1839.

I have the honour to state, for the information of His Honour in Council, that during the past month, I personally visited the site of the last discovered coal-field, on the banks of the Tenasserim river, and the results of my observations on the spot, are, that there can be no doubt we shall eventually succeed in procuring the present limited quantity of 50,000 maunds of coal, at an expense not exceeding five annas per maund—that a portion only (say 10,000 maunds) of this quantity can be brought down during the present fine season, and that the larger the quantity required to be supplied, the less will be its prime cost in depôt. The coal is found at the distance of about half a mile from the bank of the river. The intermediate space is a level, and as excellent timber abounds in the neighbourhood, there will be no difficulty in constructing a tram-road for the conveyance of the coal to the river. It is a curious circumstance that the spot where the coal was discovered, and has been dug out in small quantities by the natives, appears to be the summit of an upheaving. The spot in question is the bed of a small winding nullah, not exceeding thirty feet in width, and in the winding or small reach where the coal was first discovered, it is found by digging to the depth of a few feet only, across half the width of the nullah, while the other half has none. About the centre of the nullah it commences and appears to dip towards the S. W. (the right side of the nullah at this spot) at an angle of about thirty or thirty-five degrees, while the line of the bed itself, which I may call the line of greatest height, appears to run about N. E. but to what extent is as yet wholly unknown. A section of the right bank of the nullah discovers:

1st.—Soil to the depth of about eighteen feet.

2d.—Slate to the depth of five feet, under which is found the coal, said by those who have dug there (I was unable to test the accuracy of this assertion) to extend to a depth of ten feet, when a layer of mud of three or four feet is found, and, below that again, coal. It appeared to me that the best plan of operations would be to turn the course of the nullah (a work of no difficulty), and to take the old bed of it, at the place hitherto worked, as a kind of shaft, from whence the coal might be followed in its dip; but I have left the plan of operations entirely to Lieut. Hutchinson, from whose peculiar qualifications in work requiring mechanical skill, I feel confident the best result may be anticipated.

It is obvious from the above brief description of the nature of the coal bed, that some considerable preliminary operations are necessary, ere the coal can be worked to any extent, but I imagine there are few localities in any part of the world, presenting similar facilities. When once a clearing has been made of the nature of a shaft, from whence galleries may be carried, following the dip of the coal, and a tram-road formed for conveying it to the river, it is evident that the more coal taken out, the less will be its prime cost in the depôt of Mergui, and the only question is, what is likely to be the expense of the preliminary operations. Assisted as Lieut. Hutchinson will be by gangs of convicts, I feel confident that by the month of March, or April next, he will have every thing in train for putting coal on board the rafts, or barges provided for it, at an expenditure considerably under 8,000 rupees. When all his arrangements are thus complete, it will not matter how large the quantity of coal required may be, as the additional expense involved in procuring large quantities will be insignificant.

Extract from a letter to my address from Lieut. Hutchinson, *Superintendent of the Coal Mine.*

The reach of the nullah, in which the formation chiefly shews itself, and where some tons of coal have been dug out by the natives, runs in N. N. E. direction.

Near the south extremity of the eastern bank, the upper stratum of coal shews itself above the bed of the nullah, covered by five feet of clay-slate, six feet of iron clay, and about six feet of gravel, sand, and vegetable soil; dipping at an angle of 30° towards the N. E. There is a dislocation of the strata at this point, the whole formation sinking abruptly, two feet below the nullah bed, upon which level it extends 200 yards towards the north-west; how much farther I cannot at present say. The first stratum of coal in the horizontal bed, lies from

fifteen to thirty feet below the surface, and has been ascertained to extend ten feet in the thickness.

I have therefore determined upon sinking a shaft in this place (about fifty yards from the nullah), and, if no unfavourable circumstances occur, commencing to work the mine from this point.

(True extract)
(Signed) E. A. Blundell, *Commissr. in the T. P.*

(True copies)
(Signed) Henry Jas. Nicholls.
S. A. C. G. Tenasserim Provinces.

The thanks of the Society were voted to Colonel Cullen for the above communication.

Mr. Braddock submitted an account of his analysis of the supposed fossil from Hingolee.

NOTE,

By Walter Elliot, *Esq. on the species of Naja described in the last Number of this Journal.*

Since the notice of the Serpent exhibited at the Meeting of the Society on the 13th January last, I have received the Journal of the Zoological Society for 1838, in which, it appears that at the sitting of the 12th June, Dr. Cantor read the following notice of a new Genus proposed by him, to which the reptile figured in the last No. of the Journal appears to be referrible. It will be observed that Dr. Cantor at first considered the species described by him in the Asiatic Researches, as a Naia.

" The venomous serpent, to which I shall here call attention, is the type of a new genus; which, from its inhabiting hollow trees and frequenting the branches, I propose to call Hamadryas. Its characters induce me to assign it a place between the genera Naja, Laurenti, and Bungarus, Daudin, which two forms it will be found to connect together.

" In consequence of the strong resemblance in the general appearance between the Naja and the Hamadryas, when first my attention became attracted to the latter, I thought I could refer this serpent to that genus; and it was not until I was able to examine a specimen whose poison-fangs were untouched (those of the first specimens I saw having been drawn by the natives who are greatly afraid of this serpent) that I discovered the maxillary teeth behind the poison-fangs.

HAMADRYAS, (Cantor.)

" *Generic Character.—Head* broad, subovate, deplanate, with a short obtuse rostrum, covered above with fifteen *scuta*. *Cheeks* tumid. *Eyes* large, prominent, pupil round. *Nostrils* widely opened within the confine of two *scuta*. *Gape* very ample, subundulated. *Poison-fangs* anterior, behind which are the maxillary teeth. *Neck* dilatable. *Body* thick, smooth, imbricated with smooth scales disposed in oblique rows. *Tail* short, covered with *scuta* and *scutella*, its apex acute. (Cantor.)

" Example.—*Hamadryas ophiophagus.* (Cantor.)

" *Description.*—Above olive-green, girt with black sagittal striæ, abdomen glaucous, marbled with black. The Hindustanee name is *Sunkr-Choar.*

" *Locality.*—Bengal.

" The Hamadryas, like the Bungarus, Hydrus, and Hydrophis, has a few maxillary teeth behind the poison-fangs, and thus like the latter connects the venomous serpents with isolated poison-fangs to the harmless, which possess a complete row of maxillary teeth. Of the terrestrial venomous serpents the Bungarus is chiefly characterized by a distribution of the teeth similar to that of the Hamadryas, which, also partaking of the chief characteristic of the genus Naja, viz. that of forming a hood or disc, constitutes an immediate link between the genera Bungarus and Naja.

" Hamadryas ophiophagus differs from the Naja tripudians:

1. By its maxillary teeth.
2. By the strongly developed spines on the os occipitale inferius.
3. By the integuments covering the head.
4. By the integuments covering the abdominal surface of the tail.
5. By its colour.
6. By its size.

" According to the natives the Hamadryas feeds chiefly upon other serpents; in one I dissected I found remains of a good sized Monitor, which fact may account for its arboreal habits, as I have in Bengal, along the banks of the rivers, observed numbers of those large lizards among the branches of trees watching for birds.

" The power of abstaining from food, generally speaking, so characteristic of the serpents, is but in comparatively small degree possessed by this species; the most protracted starvation amounts to a period of about a month, while the Vipera elegans, the Naja tripudians, and the Bungarus annularis, have, without inconvenience, been confined in

cages without any food for more than ten months. Two specimens of the Hamadryas in my possession were regularly fed by giving them a serpent, no matter whether venemous or not, every fortnight. As soon as this food is brought near, the serpent begins to hiss loudly, and expanding the hood rises two or three feet, and retaining this attitude as if to take a sure aim, watching the movements of the prey, darts upon it in the same manner as the Naja tripudians does. When the victim is killed by poison, and by degrees swallowed, the act is followed by a lethargic state, lasting for about twelve hours. Such of the other Indian venomous serpents, the habits of which I have had opportunity to study from life, show themselves much inclined to avoid other serpents, however ready they are to attack men or animals, when provoked or driven by hunger; and I am not aware of any other of those serpents being recorded as preying upon its own kind. A short time ago, however, during my sojourn at the Cape of Good Hope, I received from high authority the following fact, which throws a light upon the habits of the Naja of Southern Africa, one of which, when being captured, threw up the body of a Vipera arietans (Vip. Brachyurus, Cuvier) which bore marks of having been submitted to the process of digestion.

"The Hamadryas, like the greater number of Indian serpents, evinces a great partiality to water; with the exception of the tree-serpents (Leptophina, Bell) they all not only drink, but also moisten the tongue, which, as this organ is not situated immediately in the cavity of the mouth, become in the serpents two different acts. Specimens of this serpent in my possession changed the skin every third or fourth month, a process which takes place in all the Indian serpents several times during the year. The Hamadryas is very fierce, and is always ready not only to attack but to pursue when opposed; while the Cophias, the Vipera, the Naja, and the Bungarus, merely defend themselves, which done, they always retreat, provided no further provocation is offered. The natives of India assert, that individuals are found upwards of twelve feet in length, a statement probably not exaggerated, as I have myself seen specimens from eight to ten feet in length, and from six to eight inches in circumference. I have often heard it asserted, that 'Cobras' (which name is naturally enough given to every hooded serpent) have been met with of an enormous size, but I strongly doubt their belonging to the genus Naja: among a considerable number which have come under my observation, I never saw any exceeding five to six feet in length, while the common size is about four feet. Some time before I discovered the Hamadryas, I was favoured by

J. W. Grant, Esq. of the Honourable Company's Service, with an interesting description of a gigantic hooded serpent he had observed in the upper provinces, and which, he remarked, was not a Naja. By inspection this gentleman denied the Hamadryas to be identical with the above mentioned.

"The natives describe another hooded serpent, which is said to attain a much larger size than the Hamadryas, and which, to conclude from the vernacular name 'Mony Choar,' is perhaps another nearly allied species.

"The fresh poison of the Hamadryas is a pellucid, tasteless fluid, in consistence like a thin solution of gum arabic in water; it reddens slightly litmus paper, which is also the case with the fresh poison of the Cophias viridis, Vipera elegans, Naja tripudians, Bungarus annularis and Bung. cœruleus; when kept for some time it acts much stronger upon litmus, but after being kept it loses considerably if not entirely its deleterious effects.

"From a series of experiments upon living animals, the effects of this poison come nearest to those produced by that of the Naja tripudians, although it appears to act less quickly. The shortest period within which this poison proved fatal to a fowl, was fourteen minutes; whilst a dog expired in two hours eighteen minutes after being bitten. It should however be observed, that the experiments were made during the cold season of the year."

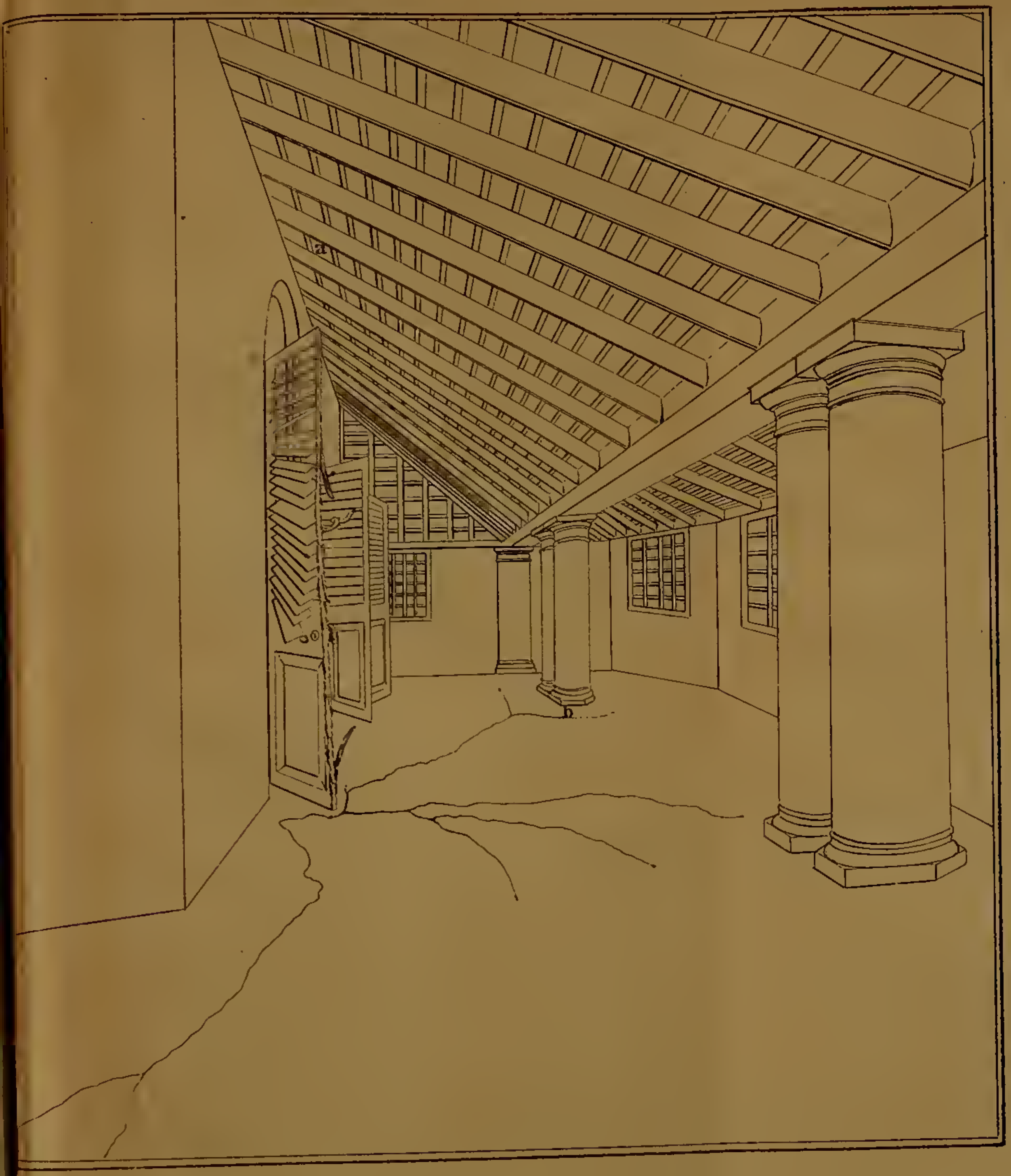
XVI.—*Meteorology.*

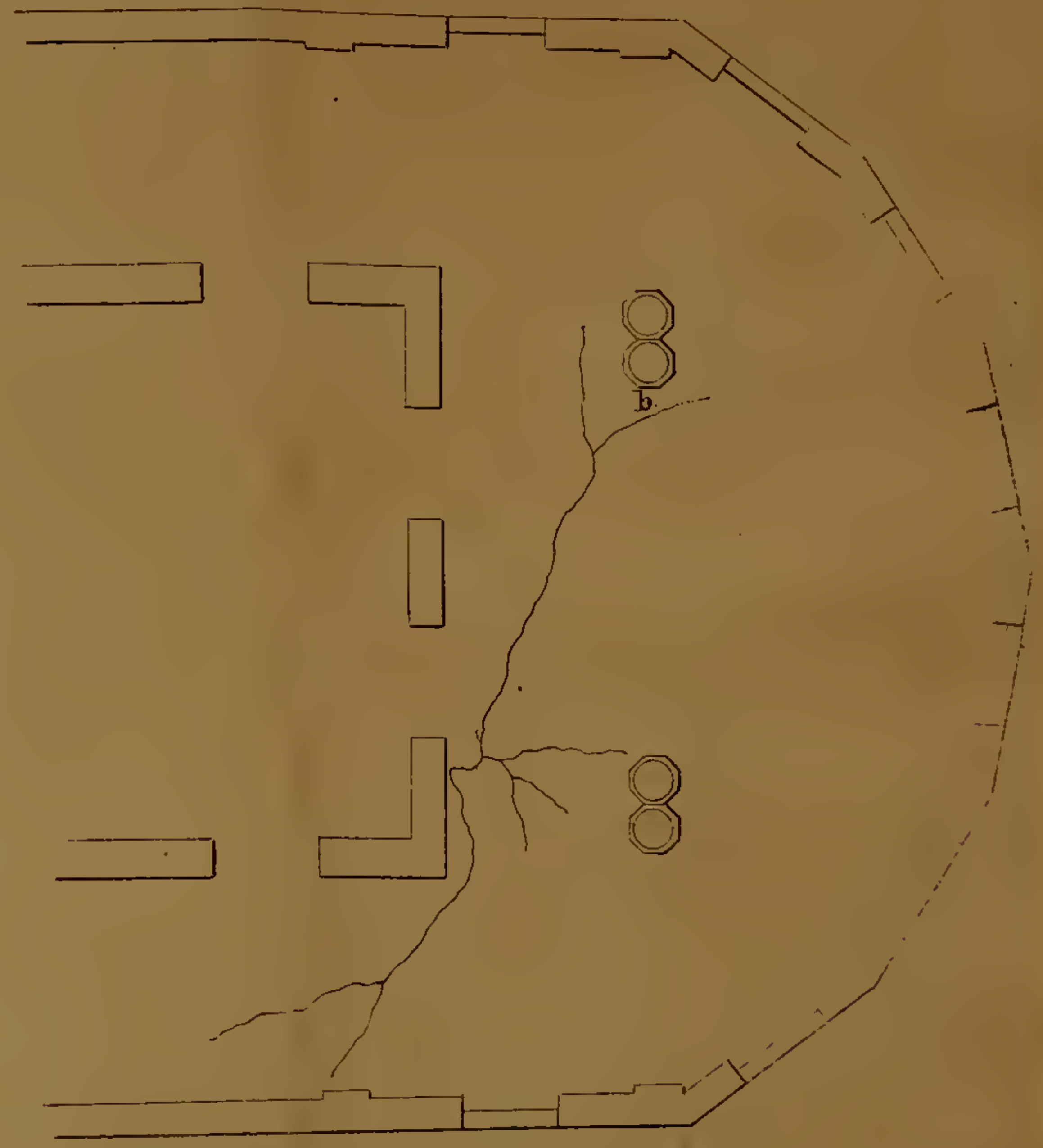
Account of the progress of the Electric fluid which struck the house belonging to Colonel Monteith, *situated on the Hill at Palaveram, on the* 1*st November*, 1839.—*By* T. G. Taylor, Esq. *H. E. I. C. Astronomer.*

Having been invited to inspect the bungalow belonging to Colonel Monteith upon the hill at Palaveram immediately after it was struck by lightning (on the 1st November last), I have thought that an account and sketch of the progress of the electric fluid, might prove as interesting to others as the inspection did to myself. The hill in question is the lowest of the two which immediately overlook the cantonment of Palaveram, and from a single barometrical measurement, would appear to be elevated 340 feet above the cantonment, and 395 feet

above the level of the sea—the other hill being about 110 feet higher: the wind which was strong and came in sudden gusts—as well as the clouds—blew from the N.E., and thunder and lightning were continuous during the evening. "At 10 minutes past 10 P. M." Colonel Monteith states, "a sharp clap of thunder, something like the report of a gun, took place close to the window, and was succeeded at the same moment by a second report *in the room*, which was instantly filled with dust;" this second report Colonel Monteith remarks "I thought at first proceeded from a loaded musket having been fired by the electric fluid"—there was a musket in the adjoining verandah—"at the same time I felt a strong shock over the fore part of the feet, and numbness, extending to the knees, which immediately went off." Colonel Monteith's impression was, that the electric fluid had entered the room through the venetians in the eastern verandah, and passing through the room, had made its exit through the venetians on the western side of the bungalow; but a careful inspection shewed, that it had struck the roof of the bungalow, which is sloping, at about ten feet below the apex, where it broke two or three tiles and proceeded through to the rafters; here refusing the conducting powers of the rafters, it descended nearly perpendicularly through a space of five feet, to a vertical iron bolt, through which it passed quietly, until arriving at the wood work of the door, which it shivered to pieces, and eventually, after passing through the rattan mat, it left a blackened impression of its force upon the chunam. Chunam being a very imperfect conductor of electricity, and hempen twine being a very good one, I should have expected that the twine-lacing of the rattan mats (which covered the whole of the floor of the bungalow), would have been selected by the electric fluid to convey its superabundant excess to the earth, but the case was otherwise; for, although twenty or thirty pieces of twine must have been all but in contact with the electric fluid, still it was evident that not one of these had enacted the part of a conductor.

The first impression on the floor, was exhibited by a dark patch nearly circular, and about an inch in diameter; from hence it separated into three main channels, each of which after pursuing a meandering course, and throwing off two or three branches, eventually stopped short as exhibited in the drawing. I noticed as curious in the terminations of these streams, that four out of the seven exhibited at their termination a circular spot, somewhat larger than the diameter of the stream itself; two others were dissipated without any mark, and that which passed under Colonel Monteith's feet (apparently the weakest of the whole) terminated in a broad splash.





References

a. *Place where the Electric Fluid entered.*

b. *The spot where Colonel Monteith was standing when the explosion took place.*

Black lines on the Floor under the mats, about 1 inch broad and decreasing to the extremities ending in a small circle.

BRITISH MUSEUM
NATURAL HISTORY

Horary Meteorological Observations made agreeably with the suggestions of Sir John Herschel.

1*st.—At the Madras Observatory on the* 21*st March* 1840.

1840.	Time.	Barometer.	Thermometer. Dry.	Thermometer. Wet.	Direction of wind.	Strength of wind.	Remarks.
Mar. 21	6 A. M.	30,052	74,8	1,3	s w	1	Clear, gentle wind.
	7	30,066	75,9	1,4	s w	1	Do. do.
	8	30,082	79,6	3,1	s w	1	Do. do.
	9	30,098	82,8	5,8	s w	2,3	Do. strong wind.
	10	30,102	85,9	8,9	s	2,3	Do. do.
	11	30,080	88,2	12,7	s w	3	Do. do.
	12	30,038	91,9	17,3	s s w	3	Do. do.
	1 P. M.	30,000	91,8	13,9	s w	2,3	Do. do.
	2	29,982	87,9	10,4	s	3	Do. do.
	3	29,956	86,3	9,3	s E	3	Do. do.
	4	29,960	84,6	7,1	s E	3	Do.
	5	29,952	83,8	6,0	s E	3	Do. along-shore wind.
	6	29,962	82,7	5,2	s by E	2	Do.
	7	29,974	81,8	4,3	s s E	2	Do.
	8	29,988	81,6	3,9	s E	2	Do.
	9	30,018	81,4	3,4	s E	2	Do. strong wind.
	10	30,022	80,0	2,2	s E	2,3	Do. do.
	11	30,014	80,0	2,5	s E	2,3	Do. do.
	12	30,004	79,8	2,3	s E	2,3	Do. do.
	1 A. M.	29,998	78,0	1,1	s	1	Do. fresh wind.
	2	29,986	77,5	1,1	s	1	Flying clouds do. dew.
	3	29,980	76,7	0,2	s	0	Do. calm do.
	4	29,998	75,7	0,4	Calm.	0	Do. do. do.
	5	29,998	75,5	0,5	—	0	Clear do. do.
22	6	30,016	75,7	0,7	s w	1	Flying clouds, gentle breeze.
	7	30,030	76,9	0,7	s w	1	Clear do.
	8	30,056	80,3	2,4	s w	1	Flying clouds, do. wind.
	9	30,088	82,4	4,0	s w	2	Do. strong wind.
	10	30,096	86,3	9,8	s	2	Do. do.
	11	30,096	86,1	8,5	s E	3	Do. do.
	12	30,050	87,1	8,6	s E	3	Clear do.
	1 P. M.	30,032	87,3	8,9	s E	3	Do. do.
	2	30,000	87,4	10,0	s E	3	Do. do.
	3	29,986	86,7	9,0	s by E	2	Do. along-shore wind.
	4	29,970	86,0	8,0	do.	2	Do. do.
	5	29,978	84,0	5,6	s E	2	Do. fresh wind.
	6	29,980	82,0	4,0	s E	2	Do. do.

2d.—*At the Trevandrum Observatory at the Vernal Equinox* 1840.

Date.	Hour.	Newman's Standard bar. corrected for temp. 32° and for capillarity.	Standard thermometer.	Depress. of wet bulb. thermometer.	Dew point.	Direction of wind.	Velocity of the wind.	Solar radiation.	Clouds, aspect of the sky and remarks.
Mar. 21	6 A.M.	29.699	76.0	2.9	71.82		,,		Cumuli about the hor.—rest clear [calm.
	7	.728	76.5	2.9	72.34	N. E.	1	2.5	Do. do. wind just perceptible
	8	.745	81.0	5.4	73.38	do.	2	7.0	Do. do. do.
	9	.757	84.0	6.4	75.12	do.	,,	5.3	Do. do. calm.
	10	.755	87.2	11.2	71.25	S. W	1	cly.	Cloudy light air.
	11	.743	88.8	10.9	73.55	do.	6	do.	Do. pleasant wind.
	Noon.	.703	89.3	11.5	73.25	do.	6	12.0	Zenith getting clear do.
	1 P.M.	.684	90.0	12.7	72.12	do.	6	13.0	Sky clear do.
	2	.647	90.0	13.1	71.46	do.	7	9.0	Do. do.
	3	.626	89.2	12.1	72.15	do.	7	8.5	Sky pretty clear do.
	4	.625	88.7	11.4	72.69	do.	5	3.0	Do. gentle wind.
	5	.635	86.7	10.9	71.12	SS. W.	4	2.0	Do. do.
	6	.643	84.7	9.6	70.94	do.	4		Do. do.
	7	.667	83.8	9.4	70.22	do.	2		Do. light air.
	8	.701	83.7	8.9	70.92	do.	,,	No observation.	Thick cumuli nearly calm.
	9	.715	83.4	7.3	73.12	do.	,,		Clearing do.
	10	.716	81.6	6.8	71.89	do.	,,		Sky clear do.
	11	.716	80.3	5.8	72.10	N.	1		Do. light air.
	Mid.	.691	78.7	4.9	71.65	NN. E.	2		Do. do.
,, 22	1 A.M.	.681	78.4	4.8	71.48	N.	1		Sky getting cloudy do.
	2	.674	77.6	4.3	71.39	do.	,,		Do. calm.
	3	.675	76.6	3.5	71.54	do.	,,		Do. do.
	4	.680	75.7	2.8	71.65	do.	,,		Sky pretty clear do.
	5	.689	75.5	3.4	70.52	do.	,,		Do. do.
	6	.702	75.0	3.2	70.30	do.	,,		Sky very clear do.
	7	.722	76.8	4.0	70.99	N. E.	1	0.5	Do. light air.
	8	.761	82.6	6.7	73.15	do.	2	3.0	Do. do.
	9	.778	85.6	9.3	72.46	do.	3	8.0	Do. gentle wind.
	10	.765	88.0	12.1	70 71	do.	3	8.5	Do. do.
	11	.737	90.6	14.0	70.67	do.	4	8.5	Do. do.
	Noon.	.695	91.7	15.8	68.89	SW. by W	6	14.0	Do. pleasant wind.
	1 P.M.	.667	91.7	15.1	70.14	do.	8	12.5	Do. brisk gale.
	2	.637	91.6	14.2	71.56	W.	10	7.0	Do. do.
	3	.628	91.0	14.2	70.82	SW. by W	6	6.0	Do. pleasant wind.
	4	.616	90.2	13.9	70.34	do.	6	2.5	Do. do.
	5	.625	88.4	10.2	73.29	do.	2	clo.	Cloudy wind just perceptible.
	6	.645	86.9	9.2	73.72	do.	2	do.	Do. do.

No Rain.

The Instruments are the same, and situated exactly as before.

G. SPERSCHNEIDER, *Superintendent.*

At the Trevandrum Observatory at the Summer Solstice 1840.

Date.	Hour.	Newman's Standard bar. corrected for temp. 32° and for capillarity.	Standard thermometer.	Depress. of wet bulb. thermometer.	Dew point.	Direction of wind.	Velocity of the wind.	Solar radiation.	Clouds, aspect of the sky and remarks.
June 21	6 A.M.	29.686	78.6	2.1	75.69				Zenith clear—rest cloudy calm.
	7	.701	80.1	2.0	77.33	W.	1		Cloudy wind hardly perceptible.
	8	.720	82.3	3.9	76.91	WN. W.	2	0.5	Light clouds wind just do.
	9	.736	83.4	5.5	75.79	W.	2	1.9	Do. do. do.
	10	.740	84.8	6.4	75.94	do.	3	7.3	Do. cumuli about horizon—gentle wind.
	11	.726	85.4	6.6	76.27	do.	3	7.8	Do. do. do.
	Noon.	.713	85.7	7.2	75.73	do.	4	6.1	Zenith clear do. do.
	1 P.M.	.695	86.8	8.2	75.44	WN. W.	5	4.6	Do. do. do.
	2	.668	86.6	8.3	75.09	do.	8	9.3	Do. do. pleasant wind.
	3	.659	86.0	7.5	75.61	do.	5	drz.	Drizzling do.
	4	.651	86.0	7.4	75.76	N. W.	5	3.0	Sky obscured with thick clouds do.
	5	.660	85.0	6.9	75.44	do.	3	0.5	Sky getting cloudy gentle wind.
	6	.671	84.0	6.4	75.12	do.	4		Overcast—at 6h. 30m. drizzling do.
	7	.679	81.5	4.4	75.39	do.	5		Clear do.
	8	.705	80.9	3.7	75.78	NW by W	5	No observation.	Zenith clear—cumuli about hor. do.
	9	.723	80.6	3.3	76.04	do.	2		Clear light air.
	10	.744	80.2	3.1	75.91	do.	4		Do. gentle wind.
	11	.734	79.8	2.7	76.13	do.	4		Do. do.
	Mid.	.726	79.6	2.5	76.14	do.	4		Sky getting cloudy—at 12h. 20m. drizzling do.
,, 22	1 A.M.	.710	79.8	2.2	76.76	W.	2		Do. light air.
	2	.691	79.5	2.2	76.46	do.	3		Sky pretty clear gentle wind.
	3	.680	78.5	2.8	74.58	do.	3		Threatening—at 2h. 20m. rain do.
	4	.672	78.4	1.9	75.77	do.	4		Zenith clear—rest cloudy do.
	5	.674	78 5	1.9	75.87	NW. by W	3		Do. do. do.
	6	.684	78.6	1.8	76.11	do.	2		Do. do. moderate breeze
	7	.703	80.2	2.4	76.88	N. W.	2	1.5	Very clear do.
	8	.708	82.1	3.8	76.84	do.	4	3.0	Cloudy—at 7h. 50m. drizz.—pl. wind.
	9	.699	83.6	5.7	75.71	WN. W.	3	6.1	Flying clouds gentle wind.
	10	.696	84.7	6.4	75.84	W.	2	5.3	Sky rather clear wind just perceptible.
	11	.678	85.3	6.2	76.73	WN. W.	4	4.8	Clear gentle wind.
	Noon.	.665	86.2	6.9	76.67	do.	6	4.3	Do. pleasant wind.
	1 P.M.	.647	87.0	7.9	76.08	N. W.	5	2.5	Zenith clear—cumuli about hor. do.
	2	.615	87.0	8.9	74.63	do.	3	3.5	Do. do. do.
	3	.598	86.5	8.4	74.84	do.	5	2.0	Sky getting cloudy do.
	4	.591	86.0	7.9	75.04	do.	6	1.4	Do. pleasant brisk gale.
	5	.599	85.0	7.0	75.30	WN. W.	7	0.3	Do. do.
	6	.611	83.5	5.9	75.32	do.	4		Do. gentle wind.

June 21st rain fell from	6 A. M. to 6 P. M.	None.
do.	6 P. M. to 6 A. M.	·0421
June 22d do.	6 A. M. to 6 P. M.	None.
	Total.	·0421

The Instruments are the same, and situated exactly as before.

G. Sperschneider, *Superintendent.*

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY; FOR THE MONTH OF JANUARY, 1840.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Ther. at 10 A. M.	Ther. at 4 P. M.	Ther. at 10 P. M.	Wet Bulb. 10 A. M.	Wet Bulb. 4 P. M.	Wet Bulb. 10 P. M.	Rain. Sun-rise.	Rain. Sun-set.	Evaporation.	Strength of wind.	Direction of Wind. 10 A. M.	Direction of Wind. 4 P. M.	Direction of Wind. 10 P. M.	Cloudy Max.	Weather. 10 A. M.	Weather. 4 P. M.	Weather. 10 P. M.	Remarks.
1840	Inch.	Inch.	Inch.	°	°	°	°	°	°			Inch.									
Jan. 1												2,096	—								
2	30,194	30,092	30,153	80,3	82,0	79,3	—	7,0	6,9	......	......	......	2,3	N E	E. S E	E	2	Fly. cl.	Clear	Clear	dew.
3	,200	,104	,200	80,3	80,0	78,5	6,8	7,7	6,0	......	......	......	2,3	N E	N E	N E	2	Fly. cl.	Clear	Clear	do.
4	,224	,119	,164	80,5	82,5	79,5	6,0	8,0	6,5	......	......	......	2,3	E	N. N E	N	2	Clear	Fl. cl.	Clear	do.
5	,174	—	,162	78,8	—	78,3	4,8	—	5,0	......	......	......	2,3	N E	—	N E	2	Fly. cl.	—	Clear	do.
6	,188	,102	,200	80,5	82,4	78,6	6,9	8,9	6,5	......	......	......	3	N E	N E	E	2	Clear	Fl. cl.	Flying clouds	do.
7	,234	,130	,216	79,6	81,0	77,2	6,6	11,5	9,7	......	......	......	3	N E	N. N E	N E	2	Fly. cl	Fly. cl.	Clear	do.
8	,220	,112	,198	77,1	82,0	76,8	11,1	—	10,3	......	......	2,818	3	N E	N E	N	2	Fly. cl.	Fly. cl.	Flying clouds	do.
9	,200	,094	,168	76,5	79,8	76,3	11,5	13,8	10,3	......	......	......	2,3	N E	E. N E	N	4	Fly. cl.	Fly. cl.	Flying clouds	—
10	,218	,125	,184	78,0	78,8	79,0	12,5	10,8	9,7	......	......	......	2,3	N E	N E by N	N	5	Cloudy	Cloudy	Cloudy	—
11	,200	,090	,176	78,3	78,6	77,6	9,0	9,6	8,6	......	......	......	2,3	N E	E by N	N E	4	Clear	Fl. cl.	Flying clouds	dew.
12	,182	,100	,170	78,6	80,8	78,0	8,6	8,2	—	......	......	......	2,3	N E	N E	—	3	Fly. cl.	Fly. cl.	Flying clouds	do.
13	,216	,125	,192	78,2	78,0	79,2	10,0	10,3	9,8	......	......	......	2,3	N E	N. N E	N E	2	Fly. cl.	Fly. cl.	Brisk breeze	do.
14	,268	,138	,222	78,4	79,2	77,8	9,9	9,2	9,4	......	......	......	2,3	N E	E. N E	NE. by E	2	Clear	Fly. cl.	Clear	do.
15	,232	,102	,182	77,8	77,8	79,2	9,0	10,2	—	......	......	3,298	3	N E	N E	N E	2	Fly. cl.	Fly. cl.	Flying clouds	do.
16	,172	,052	,146	76,5	79,1	75,7	9,3	10,6	8,6	......	......	......	2,3	E	N E	N E	4	Ely. cl.	Fly. cl.	Flying clouds	do.
17	,174	,078	,152	76,8	79,0	74,3	9,7	12,2	6,8	......	......	......	2,3	N E	N E	N	4	Clear	Fly. cl.	Flying clouds	—
18	,200	,106	,184	77,7	79,6	72,8	10,7	8,4	5,6	......	......	......	2,3	N E	N E	N	3	Fly. cl.	Fly. cl.	Clear	dew.
19	,208	—	,186	76,8	—	73,1	5,3	—	6,0	......	......	......	2,3	N E	—	N	3	Clear	—	Clear	do.
20	,230	30,122	,200	77,3	79,5	74,2	6,7	7,7	4,1	......	......	......	2,3	N E	NE by N	N	2	Fly. cl.	Clear	Clear	do.
21	,238	,110	,182	77,0	79,4	74,4	3,8	4,8	3,6	......	......	......	2,3	N	N E	N	2	Fly. cl.	Clear	Clear	do.
22	,170	,075	,152	76,4	79,5	74,2	1,9	8,2	5,1	......	......	2,859	2,3	N E	N E	N	2	Fly. cl.	Clear	Flying clouds	do.
23	,176	,078	,154	77,0	79,3	76,2	7,4	7,5	3,7	......	......	......	2,3	E	N E	N	3	Clear	Fl. cl.	Flying clouds	do.
24	,158	,038	,088	76,9	79,8	74,3	6,9	6,0	4,3	......	......	......	2	N W	E	S	3	Clear	Clear	Clear	do.
25	,102	,010	,072	76,3	80,0	74,4	4,3	7,0	3,6	......	......	......	2	E	E	E	2	Fly. cl.	Clear	Clear	do.
26	,100	—	,116	76,5	—	73,9	4,5	—	—	......	......	......	2	S E	—	N E	3	Fly. cl.	—	Flying clouds	do.
27	,160	30,040	,130	77,9	80,0	78,3	7,1	8,3	8,3	......	......	......	2	S E	E	E	2	Fly. cl.	Fly. cl.	Clear	do.
28	,128	,022	,112	78,0	80,2	77,8	6,5	6,4	7,0	......	......	......	2	S E	E	E	.2	Fly. cl.	Clear	Clear	do.
29	,154	,020	,104	78,0	80,0	75,3	6,5	8,0	6,4	......	......	2,860	2	S E	S E	E	1	Fly. cl.	Clear	Clear	do.
30	,142	,006	,088	76,8	80,1	75,9	6,2	5,1	8,1	......	......	......	2	S	S E	S E	1	Fly. cl.	Clear	Clear	do.
31	,135	—	,060	77,3	—	77,8	4,8	—	3,6	......	......	......	2	S	—	S E	2	Clear	—	Clear	do.
Mean	30,187	30,084	30.157	77,9	79,9	76,6	7,4	8,6	6,8												

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY; FOR THE MONTH OF FEBRUARY, 1840.

Days.	Barometer at			Ther. at			Wet Bulb.			Rain.		Evaporation.	Strength of wind.	Direction of wind.			Cloudy Max.	Weather.			Remarks.
	10 A. M.	4 P. M.	10 P. M.	10 A. M.	4 P. M.	10 P. M.	10 A. M.	4 P. M.	10 P. M.	Sun-rise.	Sun-set.			10 A. M.	4 P. M.	10 P. M.		10 A. M.	4 P. M.	10 P. M.	
1840	Inch.	Inch.	Inch.	o	o	o	o	o	o												
Feb. 1	30,120	—	30,108	77,8	—	76,3	5,3	—	6,1	......	......	......	2	S E	—	S E	1	Fl. cl.	—	Clear	dew.
2	30,146	—	30,132	76,3	—	76,3	6,3	—	5,4	......	......	......	2	N E	—	S E	1	Fl. cl.	—	Clear	do.
3	30,168	30,040	30,106	77,9	80,0	74,9	7,3	8,3	5,0	......	......	......	2	E	—	S E	1	Fl. cl.	—	Clear	do.
4	,156	,040	,106	76,9	80,4	76,6	5,2	7,9	5,6	......	......	......	2	E.	E	E	2	Fl. cl.	Clear	Flying clouds	do.
5	,150	,040	,132	78,3	80,3	74,9	5,7	8,8	5,9	......	......	2,301	2	S E	E	N E	1	Fl. cl.	Fl. cl.	Clear	do.
6	,148	,020	,066	77,5	80,6	74,3	6,6	8,1	5,4	......	......	......	2	E	E	N E	1	Fl. cl.	Clear	Clear	do.
7	,094	29,982	,058	76,5	80,6	77,3	5,5	5,9	6,5	......	......	......	2	S W	S E	E	1	Fl. cl.	Clear	Clear	do.
8	,104	30,028	,128	77,7	80,0	78,1	6,1	6,5	5,1	......	......	......	2	E	S E	E	2	Fl. cl.	Haze	Flying clouds	do.
9	,154	—	,130	79,0	—	79,2	4,5	—	5,2	......	......	......	2	E. NE	—	S E	3	Fl. cl.	—	Flying clouds	do.
10	,160	30,050	,108	79,6	80,7	74,8	7,0	6,2	3,9	......	......	......	2	E	E. S E	S E	1	Fl. cl.	Clear	Clear	do.
11	,154	,033	,102	79,7	80,7	77,7	7,1	6,2	4,5	......	......	......	2	N E	S E	N E	2,3	Fl. cl.	Fl. cl.	Flying clouds	do.
12	,126	,013	,086	79,2	80,5	78,7	6,0	6,7	4,5	......	......	2,240	2	N E	E	N E	2	Fl. cl.	Fl. cl.	Clear	do.
13	,114	29,990	,060	79,8	80,8	79,6	6,2	6,1	3,8	......	......	......	2	S E	S E	N E	3	Clear	Clear	Flying clouds	do.
14	,100	29,983	,050	79,9	81,0	79,4	5,9	6,0	4,6	......	......	......	2	S E	S E	—	2	Fl. cl.	Clear	Clear	do.
15	,100	29,986	,060	79,2	81,4	78,4	5,2	6,4	2,7	......	......	......	2	S W	S E	E	1	Clear	Clear	Quite clear	do.
16	,102	—	,088	80,0	—	75,7	7,0	—	3,4	......	......	......	2	S E	—	E	1	Clear	—	Clear	do.
17	,144	—	,078	78,3	—	77,9	6,7	—	4,7	......	......	......	2	N W	—	E	1	Clear	—	Clear	do.
18	,116	30,016	,100	78,1	81,3	74,5	4,4	6,3	2,7	......	......	......	2	N W	S E	N W	0	Clear	Clear	Clear	do.
19	,144	,025	,082	78,6	82,0	76,3	6,8	8,5	1,3	......	......	2,308	2	S W	SE. by S	S E	0	Clear	Clear	Clear	do.
20	,116	,017	,084	78,7	86,0	78,0	10,8	18,0	5,6	......	......	......	2	S W	S E	S	0	Clear	Clear	Clear	do.
21	,108	29,982	,070	79,7	86,8	77,9	15,0	15,3	6,2	......	......	......	2	S W	S	W	0	Clear	Clear	Clear	do.
22	,116	30,018	,100	80,3	85,0	76,3	5,8	10,0	5,0	......	......	......	2	S	S	E	0	Clear	Clear	Clear	do.
23	,162	—	,082	79,8	—	79,0	3,3	—	5,1	......	......	......	2	S E	—	N E	2	Clear	—	Flying clouds	do.
24	,214	30,108	,168	80,2	82,8	77,0	5,6	7,6	2,6	......	......	......	2	E	E by S	N W	1	Fl. cl.	Clear	Clear	do.
25	,204	,100	,180	79,7	83.0	77,4	5,2	8,0	3,4	......	......	......	2	S E	E	N E	1	Clear	Clear	Clear	do.
26	—	,062	,140	—	84,3	76,4	—	9,1	3,9	......	......	2,561	2	—	S E	E	2	—	Clear	Clear	do.
27	30,158	,050	,140	82,0	82,4	78,2	7,0	6,6	5,2	......	......	......	2	S W	S. S E	E	2	Clear	Clear	Clear	do.
28	30,156	,028	,098	79,9	85,2	80,3	4,9	10,7	1,8	......	......	......	2	S E	S. S E	S	1	Clear	Clear	Clear	do.
29	,136	,023	,098	80,3	84,0	80,3	5,4	7,5	4.3	......	......	......	2	S E	S	S	1	Clear	Clear	Clear	do.
Mean	30,138	30,027	30,101	79,0	82,2	77,3	63	8,3	4,5												

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY; FOR THE MONTH OF MARCH, 1840.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Ther. at 10 A. M.	Ther. at 4 P. M.	Ther. at 10 P. M.	Wet Bulb. 10 A. M.	Wet Bulb. 4 P. M.	Wet Bulb. 10 P. M.	Rain. Sun-rise.	Rain. Sun-set.	Evaporation.	Strength of wind.	Direction of Wind. 10 A. M.	Direction of Wind. 4 P. M.	Direction of Wind. 10 P. M.	Cloudy Max.	Weather. 10 A. M.	Weather. 4 P. M.	Weather. 10 P. M.	Remarks.
1840	Inch.	Inch.	Inch.	o	o	o	o	o	o												
Mar. 1	30,134	——	30,124	80,0	-—	79,8	6,5	—	5,0	......	......	......	2	S W	——	S	0	Clear	Clear	Clear	dew.
2	,164	30,058	,140	79,5	83,4	79,8	6,5	9,6	8,8	......	......	......	2	S E	S E	S	0	Clear	Clear	Clear	do.
3	,158	,068	,148	79,8	82,0	76,3	8,3	9,4	6,5	......	......	......	2	E	S E	W	0	Clear	Clear	Clear	do.
4	,180	,060	,132	76,0	82,3	77,2	4,3	8,8	6,7	......	......	2,491	2	S W	S E	E	1	Clear	——	Clear	do.
5	,164	,040	,112	78,6	82,6	76,9	5,9	10,3	7,3	......	......	......	2	S W	S E	E	0	Clear	Clear	Clear	do.
6	,156	,034	,128	78,6	83,5	79,7	6,6	9,0	6,8	......	......	......	2	S W	S E	S	0	Clear	Clear	Clear	do.
7	,160	,055	,124	80,0	83,0	77,8	6,0	8,0	3,2	......	......	......	2	S E	S E	S	2	Clear	Clear	Clear	do.
8	,154	——	,098	79,9	—	79,3	6,8	—	8,7	......	......	......	2	S E	——	S E	0	Clear	——	Clear	do.
9	,142	——	,092	80,3	—	80,2	8,2	—	6,5	......	......	......	2	S	——	S E	2	Clear	——	Clear	do.
10	,136	30,023	,116	80,6	84,0	78,6	6,1	9,0	5,6	......	......	......	2	S E	S E	S E	0	Clear	Clear	Clear	do.
11	,108	,020	,050	80,8	84,2	80,8	5,9	9,7	4,4	......	......	2,638	2	S	S E	E S E	1	Fl. cl.	Clear	Clear	do.
12	,112	29,988	,056	81,5	84,0	78,8	6,5	7,0	3,8	......	......	......	2	S	S E	S	0	Clear	Clear	Clear	do.
13	,102	,986	,078	81,8	83,8	80,3	4,4	5,8	4,3	......	......	......	2	S	SE. by S	S E	1	Clear	Th. hz.	Clear	do.
14	,104	,990	,050	80,5	83,8	80,8	4,8	7,3	3,4	......	......	......	2	S	S E	S E	0	Clear	Clear	Haze	do.
15	,070	——	29,088	82,4	—	81,4	7,4	—	5,9	......	......	......	2	S	——	S E	0	Clear	——	Clear	do.
16	,030	29,978	30,004	82,1	81,8	81,9	5,7	6,8	3,0	......	......	......	2	SW. W	S E	S E	1	Clear	Clear	Clear	do.
17	,068	,960	,062	82,3	86,0	81,8	5,1	7,0	3,8	......	......	......	2	S W	SE. by S	SE. by S	2	Fl. cl.	Clear	Flying clouds	do.
18	,094	,970	,062	82,0	84,0	81,5	5,8	6,5	5,0	......	......	2,421	2	S W	S E	S E	1	Clear	Clear	Clear	do.
19	,100	,968	,046	82,3	83,7	80,4	7,3	7,7	4,4	......	......	......	2	S	S	S E	1	Clear	Clear	Clear	do.
20	,090	,960	,058	83,8	84,4	81,5	7,3	5,6	4,0	......	......	......	2	S E	S E	S E	0	Clear	Clear	Clear	do.
21	,102	,960	,022	85,9	84,6	80,0	8,9	7,1	2,2	......	......	......	2.3	S	S E	S E	1	Clear	Clear	Clear	do.
22	,096	,970	,042	86,3	86,0	81,8	9,8	8,0	3,5	......	......	......	2.3	S	S E	S E	0	Fl. cl.	Clear	Clear	do.
23	,102	,968	,040	82,8	86,0	81,8	5,8	8,0	4,3	......	......	......	2.3	S	S	S	1	Fl. cl.	Clear	Clear	and along-shore wind.
24	,080	,940	,020	83,9	86,0	82,5	6,4	6,0	4,0	......	......	......	2.3	S W	S	S E	1	Fl. cl.	Clear	Clear	distant lightning NW.
25	,054	,973	,050	84,0	86,0	83,5	6,0	6,0	4,0	......	......	2,716	2·3	S E	S E	S	1	Fl. cl.	Clear	Clear	distant lightning NW.
26	,058	,960	,040	84,4	86,0	83,8	5,9	5,2	5,3	......	......	......	2.3	S E	S	S E	2	Fl. cl.	Clear	Fl. clouds	lightning to the SW.
27	,016	,916	29,988	83,0	85,8	83,0	4,7	6,8	5,0	......	......	......	2.3	E	S E	S	1	Clear	Clear	Clear	lightning to the W.
28	,005	,906	,996	86,4	86,4	83,9	7,4	6,9	3,4	......	......	......	2.3	S	S E	S	2	Clear	Clear	Clear	lightning to the W.
29	,020	——	30,030	86,0	—	83,7	7,5	—	5,7	......	......	......	2.3	S W	——	S	2	Clear	——	Clear	lightning dew.
30	,052	,980	,060	84,3	84,8	82,3	4,3	7,3	4,3	......	......	......	2.3	S E	S E	S	2	Clear	Clear	Clear	lightning do.
31	,096	,974	,062	83,4	85,8	82,5	5,4	8,8	4,5	......	......	......	2.3	S E	S E	S E	2	Clear	Clear	Clear	lightning do.
Mean	30,100	29,989	30,065	82,0	84,5	80,8	6,4	7,6	4,9												

The Instruments with which the foregoing observations are made, are placed in the Western Verandah of the Honourable Company's Observatory; at about five feet above the surface of the ground, and twenty-seven feet above the level of the Sea; the thermometer was made on purpose for the Observatory, and at 75° (the only point at which a comparison has been made) it was found to differ insensibly from the Royal Society's Standard; the barometer is one of two Standards which have been lately constructed, and may be depended upon to 0,0100 an inch.

J. Crisp, Major.
H. C. Acting Astronomer.